

Railway Age

Vol. 85 August 25, 1928 No. 8



"Sunset Limited" crossing the Mississippi on Southern Pacific Car Ferry.

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Published every Saturday by the Simmons-Boardman Publishing Company, 34 North
Crystal Street, East Stroudsburg, Pa., with executive offices at 30 Church Street, New York.

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The Railway Age is a member of the Associated Business Papers
(A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues and special daily
editions published from time to time in New York, or in places
other than New York, payable in advance and postage free; United
States, Mexico and Canada, \$6.00. Foreign countries, not including
daily editions \$8.00.

Subscriptions for the fourth issue each month only (published in
two sections, the second of which is the Motor Transport Section)
payable in advance and postage free; United States, Mexico and
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Railway Age

Vol. 85, No. 8

August 25, 1928

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Accidents at Open Switches

A PERUSAL of the reports of train accidents during the last few years brings out the fact that a considerable number of the serious ones are being caused by misplaced or defective main-line switches. In the report of the Bureau of Safety, concerning an investigation of a recent accident of this nature on a south-eastern railway, it was stated that it is believed that the switch was left open by the track forces, notwithstanding the statement of the section crew to the contrary. Be that as it may, it was definitely established that the accident was caused by a misplaced switch. An automatic signal with a switch circuit controller on this switch would have served to check its position and warn the engineman of the dangerous condition. In recent years, a great deal has been said regarding the economic advantages of automatic block signals in increasing track capacity and preventing collisions, all of which are important. However, the idea that signals also check the position of switches should not be overlooked when considering the results to be accomplished by proposed installations.

The Trend in Construction Equipment

ONE of the outstanding developments in railway construction methods of late has been the change in the character of equipment employed. A couple of decades ago these methods were built around the heavy steam shovel, with its three-yard or larger dipper, which was used so widely by the railways that it was known as a railway-type shovel. Within the last few years, however, these units have given way very largely to smaller equipment which, while not providing as large an output on big work as their predecessors, are more versatile and capable of a wider diversity of applications. Even more striking, however, is the fact that the time-honored mounting on flanged wheels is giving way rapidly to caterpillar or crawler treads, thereby freeing these units from their confinement to tracks. This transition is in part an evidence of the change that is taking place in the character of railway construction work, in which outstanding projects involving the handling of millions of yards of earth, commonly independent of operated lines, are giving way to less radical but more numerous improvements adjacent to operated lines and frequently of necessity handled in connection with train operation. On such work the smaller equipment is equally or more applicable. The transition to the smaller units is due still more, however, to the increasing adaptability of the more recent equipment for a wide diversity of problems, with the result that the possibilities of much of this equipment are limited today only by the ingenuity of those in charge

in adapting it to new problems as they arise. This equipment offers many advantages to the roads. Its development is so rapid that one must be alert to keep informed regarding it. It has been said that "one must run like hell today to keep from standing still." Nowhere is this more true than in the study of developments in construction equipment available for railway work.

The First Half of 1928

STATISTICS of the Interstate Commerce Commission issued within the last week have made available the facts as to the reductions in the different classes of expenses by which the railways made their total operating expenses in the first six months of this year almost \$105,000,000 less than in the first six months of last year. They reduced their transportation expenses \$54,345,000. Transportation expenses are those incurred in the movement of trains and cars and a reduction of them is an actual saving. They also reduced their maintenance of way expenditures \$15,524,000, and their maintenance of equipment expenditures \$35,311,000, a total reduction in expenditures for the maintenance of the properties of almost \$53,000,000. A substantial reduction of maintenance expenditures usually is not a saving. The total expenditure for maintenance was the smallest that has been made in the first one-half of any year since 1922. It is plain that the reduction on many railways has been due largely to a policy of retrenchment adopted because of inadequate earnings. The large reduction in total operating expenses made them less than in the first half of any year since 1922. In fact, they were almost \$110,000,000 less than the average for the first six months of the preceding five years and \$240,000,000 less than in the first half of 1923, or five years previously. The reduction was not sufficient, however, to offset the reduction in total earnings, which were more than \$118,000,000 less than in the first half of 1927. The reduction in freight earnings was about \$75,400,000, or 3.3 per cent, and the reduction in passenger earnings about \$37,400,000, or almost 8 per cent. The net operating income earned was \$462,000,000. This was \$11,000,000 less than in the first half of 1927, and almost \$34,000,000 less than in the first half of 1926. It was only about \$15,000,000 more than in the first half of 1923, although during the last five years the railways have invested about \$4,000,000,000 of new capital to enable them to render good and adequate service, and upon which they are supposed to be allowed to earn a fair return. They earned much less than a "fair return" upon their previous investment in 1923. A return of 5¾ per cent upon this new investment alone would be for a year, more than \$200,000,000, and therefore, for six months, more than \$100,000,000. It will be seen that

the increase in net return which has followed upon the making of this new investment is at an annual rate less than one-sixth as great as it should be to yield upon it an annual return of $5\frac{3}{4}$ per cent.

Cost Accounting Plus

A WELL-INFORMED industrial engineer recently made the statement, publicly, that he knew of no industry, considered as a whole, except the railroads which had uniformity in cost accounting. The only astonishing part about this statement is the necessity for its being made at all. It must be recognized, however, that there is a general delusion to the effect that railroads do not know anything about costs or about cost accounting systems. Well-meaning people, suffering under that delusion, are constantly endeavoring to tell the railroads all about it. Some of these people may pleasantly anticipate that some day the public will develop a voracious appetite for figures, which must be gratified regardless of cost or usefulness. If that day should come, it might be necessary to try to put together all the diversified ideas on cost accounting, and produce a super-cost-accounting system for the railroads. Perhaps also a race of super-clerks may be developed who can operate such a system. Until that day arrives, however, the railroads must continue their accounting based on actual and practical needs and conforming to long established and well recognized principles—a system which, while perhaps not perfect in all details, has at least more of uniformity, considering the immensity of the structure, than any other industry can show.

How Much and How Effectively Do You Study Railroad Problems?

ELSEWHERE in this issue appears a brief article telling of the summer course in railroad problems offered by the Harvard Graduate School of Business Administration, which course, a six weeks' session, has just been given for the first time. The course was intended for railroad officers and department heads and was designed to be eminently practical. That it has been so all the railroad men who attended testify. It was conducted by Professor Cunningham of Harvard and Professor Daniels of Yale, the mention of whose names is sufficient guaranty of the high caliber of the work done. The "case method," i. e., instruction based not on text-books but upon specific problems from actual railroad experience, was used. Incidentally, it gives us a great deal of satisfaction to note that of 48 cases studied in Professor Cunningham's part of the course, 23 were drawn from articles which have appeared in the *Railway Age*. Progress in an industry depends upon the rapid spread to the entire industry of new ideas effecting it. Through the business press and by various other channels these new developments are made public as they occur, and alertness on the part of the

leaders in the industry results in their being generally applied. An intensive course of study such as that given at Harvard for men actually engaged in railroad work should fit the students to be increasingly alert in finding solutions for their own problems. Reading and study by railroad men have been of great benefit to the railroads and have brought promotion for the students. And yet the possibilities of additional effort expended along these lines are almost limitless. What do you read? How intelligently do you relate what you read to your everyday problems? These are questions which all of us in railroad work can ask ourselves. A summer course such as that given at Harvard suggests a possible method of insuring more satisfactory answers to these two questions.

Revision of Rules

THE rules governing the operation of a railway are necessarily somewhat complex, but, in general, they are by no means incomprehensible to the minds of those for whose guidance they are prepared. In fact, on certain railways, it is not at all unusual to find trainmen whose knowledge of the rules and their practical application is excelled by those of no one on the railway. Campaigns of one sort or another are responsible for much of this, coupled with a real interest in his job on the part of the employee. Too much stress cannot be laid upon the proper and practical application of the rules to actual operations. A mere parrot-like ability to repeat any given rule by rote is not sufficient unless it is accompanied by a knowledge of how, where and when the rule applies. To encourage this, only such rules as have an actual, modern application should be included in the rule books. This is an aid in that it tends, through simplification, toward a clearer understanding, and also because it increases an employee's respect for effective rules, if the rule book does not contain archaic rules, without present-day application. The activities of rules committees should include the weeding out of inoperative rules quite as much as the inclusion of new rules. Their task should be one of revision, always in the interests of clarity, which, in most instances, can most readily be obtained by simplification.

Grates for the Stoker

IN an article on another page of this issue, F. B. Roesch directs attention to a fact concerning the mechanical stoker in its relation to other parts of the locomotive affecting combustion, which has, perhaps, never received quite the consideration it deserves; i. e., that the stoker has been compelled to make its reputation with grates which were developed for hand firing. By far the greater proportion of the losses from incomplete combustion, which cause a marked reduction in locomotive boiler efficiency as the rate of firing increases, result from the unconsumed carbon which leaves the firebox in its solid state. As Mr. Roesch points out, the stoker supplies what amounts to screenings to a thin fire, whereas the hand-fired locomotive is

furnished with lump coal with which the depth of fire may be regulated to keep down stack losses to a minimum. Mr. Roesch argues for the use of the so-called round-hole type of grate with a restricted percentage of air opening. Whether or not this is the ultimate type of grate for the stoker-fired locomotive, its use has at least demonstrated the fact that there is something more required of grates than air opening. If the restrictions in the air opening do not mark the final solution of the grate problem, there must be some other modification in the distribution of air through the grate which will not permit fuel to be blown through the firebox and out the stack without time for combustion. The stoker is now an essential part of the locomotive and it is time that grates were developed to fit stoker requirements.

Co-operation with Trade Associations

NOT a few railway purchasing officers and others view the development of trade associations and bureaus with some alarm. These bureaus are however not infrequently a positive help to various roads. A novel example has been afforded as a result of the method adopted recently by a large carrier to secure the lumber required for rebuilding a large number of cars. The road was about to rebuild the cars by company forces. Lumber with strength and endurance equal to the requirements was available in the territory tributary to its line, but no single local mill could produce all the lumber needed and assure delivery. One could produce large amounts at one size, but it did not have the stands for producing another size, or could not produce the grade economically because of having no sure market for the by-product.

Furthermore, the companies which could offer the lowest price could not be depended on to meet specifications. The carrier had been securing lumber in this territory for years, and it desired to avoid the practice of pitting each mill against the others and dividing the business in accordance with the lowest price offered. This method had failed to work satisfactorily and it was decided to negotiate with the mills as an association.

Bids were first issued and prices obtained on competitive lumber; prices were also obtained from producers who did not belong to the association. With these prices available, all producers in the association and the association's officers were called into conference. Each item was considered and specifications and delivery requirements fully explained. As a result, the mills forming the association undertook to fill practically the entire order. To fix responsibility, the contract was made with one of the producers, which simplified matters for the railway, but it was understood that the association assumed the moral responsibility for the production, and it was left to the association to divide the order among the different mills as it saw fit. The requirements were confined to two grades, a uniform price was adopted for each grade, and a freight allowance made for producers not on the lines of the carrier, while deliveries were to be made as called for.

The lumber was bought subject to moisture content requirements, to be fulfilled by kiln drying at the mills, and was also subject to shipping point inspection. Notwithstanding this, an exceptionally small amount was rejected, and in every instance the lumber was received from the various mills within the time limit for delivery. In many instances it was possible to handle the lumber direct to the cars being rebuilt, instead of storing it at an additional expenditure for rehandling. In this instance a trade association and its resources proved a distinct aid to the consumer.

Railroad Policy and Public Relations Work

THE relations between the public and the railways have undergone a marked change within recent years, and this has caused an equally marked change in the problem presented to those who are charged with doing railway public relations work.

A letter written by J. G. Woodworth, vice-president of the Northern Pacific, which was published in a recent issue of the Chicago Journal of Commerce, and comments upon it that were made by Glenn Griswold, constitute a good statement of the situation with which those doing railway public relations work are confronted. We publish Mr. Griswold's article containing Mr. Woodworth's letter elsewhere in this issue.

Mr. Woodworth remarked that "people were interested in the railroad question a few years ago and were right-minded about it. But in the absence of car shortages and other disagreeable things it does not seem possible to maintain this interest. It is also the general impression," he added, "that the railroads are doing pretty well and that they can stand some rate reductions, and that the diversion of some of their business to the water carriers will not hurt them, but we cannot blame the ordinary citizen very much because these suggestions come from men in high places who are supposed to be not unfriendly to the railroads." Mr. Griswold, in his comments, said, among other things, that "public understanding of these problems is not spontaneous," and emphasized the need for the railways to put forth greater efforts to make the public understand their situation and problems.

Mr. Woodworth and Mr. Griswold, one speaking from the standpoint of a railway officer and the other from the standpoint of a newspaper man who is extremely well-informed regarding railway matters, agreed that the most significant fact to be considered is that the public's present attitude toward the railroad situation is one of comparative indifference. There are almost no manifestations of public hostility and many manifestations of friendliness. But when the attention of the public, and especially of business men, is called to the fact that the percentage of net return being earned by the railroad industry is the smallest since 1922, they not only show no concern, but very little interest. They are pleased because railroad service is good, and seem to assume it always will be good—that the railways, in some way, will get enough earnings to keep it good, or will keep it good without adequate earnings. The Hoch-

Smith resolution contemplates that reductions of rates on farm products, if made, shall be offset by advances upon other commodities, if they are needed, but most business organizations offer no opposition to the demand for reductions on farm products, and some metropolitan newspapers that may be assumed to express the attitude of business men actually advocate them, while ignoring the advances on other commodities which, in consequence, would be warranted. In most parts of the country business interests are promoting the diversion of traffic from the railways to waterways and highways. Meantime, advances in railway wages continue. Most of these are directly or indirectly the result of awards of arbitration boards upon which representatives of the public hold the balance of power, and, therefore, afford another illustration of the public indifference to prevailing tendencies in the railroad industry.

The public's attitude toward the railroads is negative rather than positive. It is showing no strong feeling of any kind toward them, but apparently its general sentiment is that, since service is so good and prices of stocks higher than a few years ago, the roads must be getting along pretty well. It evidently believes that statements which occasionally emanate from railroad sources that net operating income is unsatisfactory and declining are exaggerated. Its proneness to believe this is increased by the frequent publication in the newspapers of figures showing that this or that road is doing unusually well, and by interviews occasionally given by railway officers expressing optimism about the prospects of their own properties. The result is that with public sentiment toward the railways better than ever before the general trends of the earnings and expenses of the industry are almost as unsatisfactory as they ever were when public sentiment was hostile.

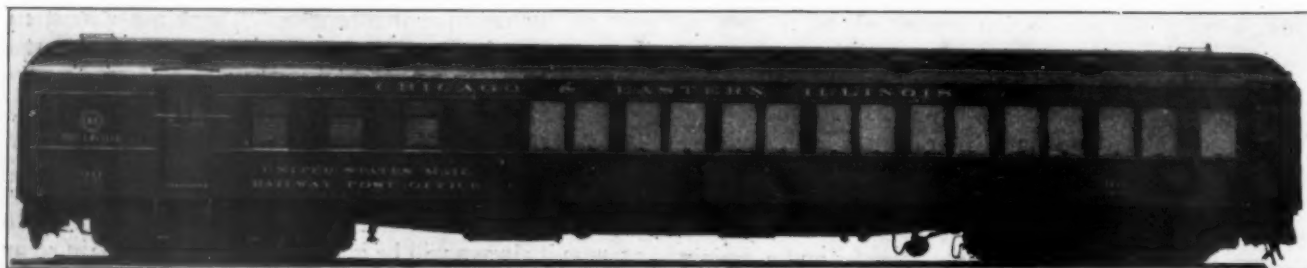
We have said that the public's attitude toward the railroads is negative rather than positive. Is it not a fact that the present policy of the railroads is, in some very important respects, also negative rather than positive, and that this helps to explain both the attitude of the public and the prevailing drift in the industry? If the relations between earnings and expenses were satisfactory, or were promising soon to become so, it might be sound policy for the railways to refrain from seeking broad and constructive changes in the regulation applied to them and from having their public relations officers definitely advocate such changes. But the present situation and tendencies justify the railways in demanding such changes. They would justify them in agreeing among themselves upon, and presenting to the public, a definite program regarding competing means of transportation, the regula-

tion of rates and the regulation of wages such as apparently must sooner or later be accepted by the public and adopted by the government if the railroad industry is to continue to function efficiently.

If the railroads should formulate such a program they would thereby give their spokesmen something definite to present and advocate. Such a program ought to be advocated before the Interstate Commerce Commission, before committees of Congress and before meetings of farmers and business men. It would put the railways in the position of having not merely a negative but a positive policy of not merely complaining about poor earnings and opposing this, that or the other measure, but of seeking to improve their earnings by advocating definite measures for accomplishing that purpose. Confronted with such a program, and told why it was necessary, the public would no longer remain indifferent. It might at first be hostile. But, in the long run, a friendly public sentiment secured at the price of inadequate earnings would cost too dear. The railways would better have a less complacent public sentiment and better earnings than a public that is satisfied while railway earnings are unsatisfactory and becoming more so.

The policies of the railroads as regards management and regulation, in general, and public relations work, in particular, are so interlocked that upon their policies as regards the former depends the effectiveness of the public relations work that can be done for them. The purpose of public relations work is to cause all classes of the public, including the employees, to assume an attitude which will be helpful to the managements in their efforts to manage the properties well and secure such regulation as will enable them to earn fair returns and thus assure the continuance of good and adequate service and economical operation. Unfortunately, the railways, as an industry, have at present no definite and consistent policy for securing for the industry the net revenues that it needs and to which it is entitled. Mr. Griswold, in the article quoted elsewhere in this issue, says, "The public will read and will have an interest in railroad problems, and will have a sympathetic and constructive attitude toward the railroads, when the message is honestly, directly and simply told and often repeated." But the message, in order to create a constructive public sentiment, must itself be constructive. It must not only tell what the railroads have accomplished and are still accomplishing, but also the measures to which they are opposed and which they favor and the reasons why they are needed. The purpose of railway public relations work should be to "sell" the public a sound railroad policy, but the first essential to selling such a policy is to formulate it.

* * *



New All-Steel Mail and Smoking Car Built by Pullman for C. & E. I. Trains Between Chicago and St. Louis



Architect's Drawing of the Station and Coliseum Building

B. & M. Opens First Unit of New Passenger Station at Boston

Unusual structure is surmounted by huge convention hall as first unit of extensive passenger terminal development

THE OLD North station of the Boston & Maine at Boston has gone, and in its place has risen a new passenger station as the center of an extensive terminal development project. Cooperating with the city of Boston, the new terminal project, in addition to providing enlarged and modern facilities for the Boston & Maine, includes a coliseum and sports arena with a seating capacity of from 14,000 to 18,000 persons, a large 13-story industrial building housing offices, display areas and storage space, and an extensive program of new thoroughfares and street widening which will afford easy access to the new terminal from all sections and suburbs of Boston. The new project also includes the possibility of a 600-room hotel.

All of these improvements lie on the site of the old passenger terminal of the Boston & Maine and front for a distance of 700 ft. on Causeway street, which has been widened to 110 ft. to afford easy traffic access to the new facilities. The new passenger station, which is surmounted by the coliseum, forms the central unit of the development. This is flanked on the east by the new industrial building now under construction, and, at a later date, may be flanked on the west by the large hotel which is under consideration.

Station and Coliseum to Cost About \$4,000,000

The new passenger station and coliseum building, which will cost in the neighborhood of \$4,000,000, is being built by the Boston & Maine, which has arranged for the operation and control of the coliseum facilities, under lease, by the Boston Madison Square Garden Corporation. The new industrial building is being built

by the North Station Industrial Building, Inc., Boston, on ground sold by the railroad company to further the new North station development.

One of the outstanding features of the new development is its availability from all sections of the city and its suburbs, being within walking distance of the business section of the city, and being served by through thoroughfares, surface lines, elevated and subway lines, and in addition, by the extensive facilities of the Boston & Maine. In a study of the transportation situation made in connection with the project, it was brought out that the combined transportation facilities serving the new development area, other than surface vehicles, are equipped to deliver to the North station approximately 1,000 passengers per minute.

Old Facilities Will Be Completely Removed

The old passenger station facilities of the Boston & Maine at Boston consisted of three units located together along Causeway street, more or less co-ordinated through individual connection with one main train concourse. These units consisted of the old Boston & Lowell station at the west end of the station layout, and the old Fitchburg station at the east end of the layout, these units being connected by the terminal of the Boston & Maine proper. All of these stations, which have been operated as a unit by the B. & M. for a number of years, were of brick construction, and while still serviceable from a structural standpoint, were inconsistent with the road's policy of affording Boston, and New England in general, the best possible transportation facilities.

For a number of years the Boston & Maine has planned for the unifying and modernizing of the freight and passenger terminal facilities of its various constituent roads at Boston, but, owing to lack of funds, it was not until the last few years that it was possible to undertake this work. Early this year saw the completion of the unification and modernizing of the road's extensive freight terminal facilities at Boston, described in the May 28, 1927 and July 7, 1928 issues of the *Railway Age*; and with this work nearing completion, attention was turned to the new passenger station project. Through concerted effort on the part of the road, plans developed and broadened rapidly, until the new station project was enlarged to include the large transportation, industrial and civic enterprise herein outlined.

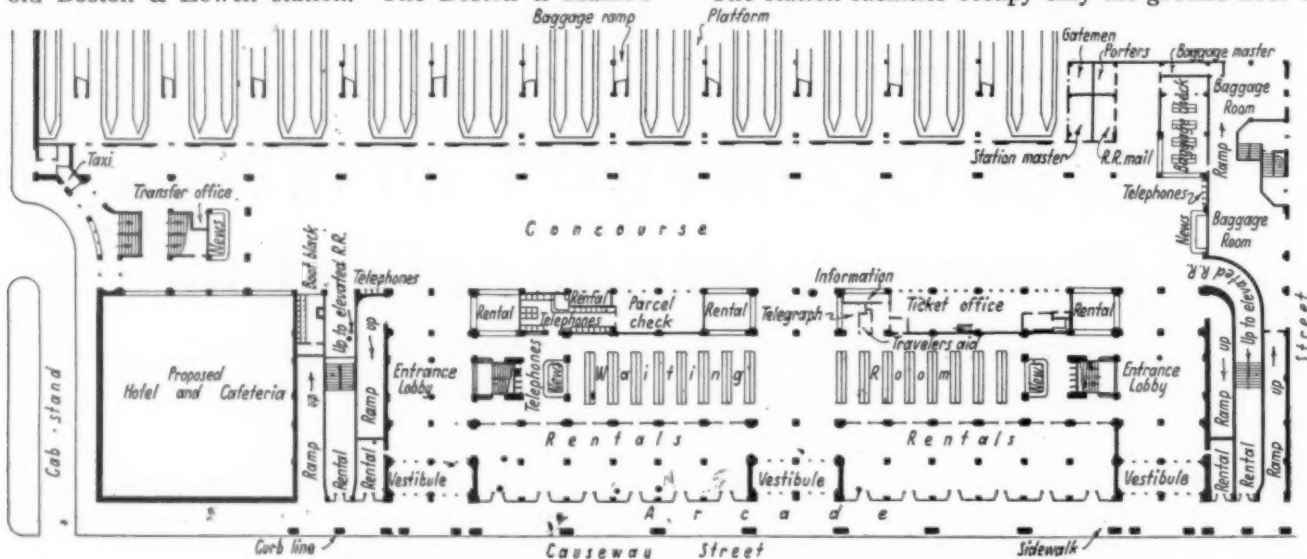
As it is being carried out, the new North station occupies the area formerly occupied by the old main station building; the new industrial building is being constructed on the site of the old Fitchburg station, and the proposed new hotel will occupy the site of the old Boston & Lowell station. The Boston & Maine's

concrete piles, driven from 40 to 45 ft. to point of cut-off. In driving the piling considerable difficulty was encountered with old submerged sea walls and foundations which had to be blasted out before driving could be continued. This involved the construction of open cofferdams in a number of instances, and a large amount of other auxiliary work.

Throughout, the building is of steel and concrete construction, faced with buff brick, and trimmed with artificial cast stone. It is approximately six stories high, and owing to the character of the foundation material on which it rests, and its close proximity to the water, it has no basement.

The front of the building is of pleasing architecture, the main body of the front elevation consisting of seven large panels of ornamental steel sash, separated by brick pilasters, extending to a height of about 80 ft. above an arch-faced arcade at the street level. At each end of the building, bold pilasters rise from the street level to a point above the main roof coping and form tower-like structures.

The station facilities occupy only the ground floor of



Plan Showing the Arrangement of the New Station Facilities

part in this project has been principally the razing of the old North station, the construction of the new station and surmounting coliseum, and the rearrangement of track facilities to meet the new conditions. This work, which was started in December, 1927, has been marked by unusual progress under the severe handicap of maintaining uninterrupted passenger service while wrecking work and construction were under way.

The size of this handicap, and the magnitude of the problem of maintaining passenger accommodations during construction, is better realized when it is known that throughout all of the work, approximately 365 trains and about 80,000 passengers a day have used the temporary station facilities. In spite of this volume of traffic, so thorough were the measures taken that practically all train schedules were maintained and there was a marked absence of inconvenience to passengers.

Station Building Is Attractive

While still incomplete in a number of details, the new station-coliseum building has taken full form, and the first section of the passenger station facilities was put in service on August 19. In plan, the new building fronts for 550 ft. on Causeway street, and has a depth of 170 ft. from the curb line to the train gates along the rear of the train concourse. The building is entirely on made ground, and is supported on about 1800 Simplex

the building and a mezzanine floor which extends around all four sides of the large waiting room. Above these two levels, the building is given over entirely to the convention coliseum and sports arena.

In order to provide for the widening of Causeway street, the front face of the building was set back 35 ft. on the railroad company's property, and the sidewalk on the station side was cloistered or arcaded within the building proper. Along the inside of the sidewalk, the building frontage is occupied by stores and shops which have a depth of 32 ft. to display windows and entrances into the station waiting room.

Three main public entrance vestibules and lobbies afford convenient approach to or exit from the station facilities at the street level. These lobbies are located at each end of the building, and in the center, and extend through the building, with direct contact with both the waiting room and the train concourse. Separate entrances for those arriving or departing by the city elevated railway, which passes in front of the station, have also been provided at each end of the station.

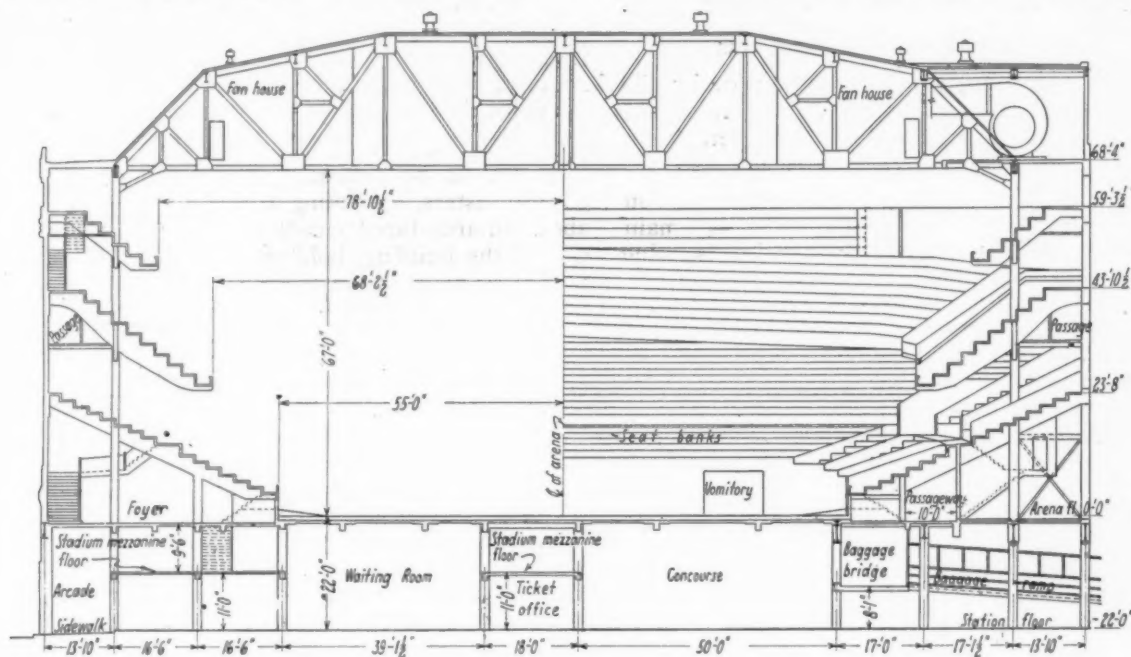
Waiting Room and Mezzanine Floor

The waiting room, which is 40 ft. wide by 275 ft. long, occupies the main part of the station, directly back of the shop area along the front. Back of this, and extending to the west is the train concourse, which is sepa-

rated from the waiting room by an enclosed area, 18 ft. wide. This area is divided into sections occupied by ticket offices, parcel rooms, telephone booths, news stands and information and telegraph booths, so arranged as to serve patrons in both the waiting room and the concourse. The ends of the waiting room in each case are occupied by a news stand, telephone booths, and a stairway leading to the mezzanine floor.

reached by an open passageway which faces on the waiting room.

At the east end of the mezzanine floor, the principal facilities include a rest room and toilet facilities for women, a travel bureau office, a fan room and a private office for the general passenger agent. At the west end of the floor the space is occupied principally by toilet facilities for men, a barber shop, a fan room and rental



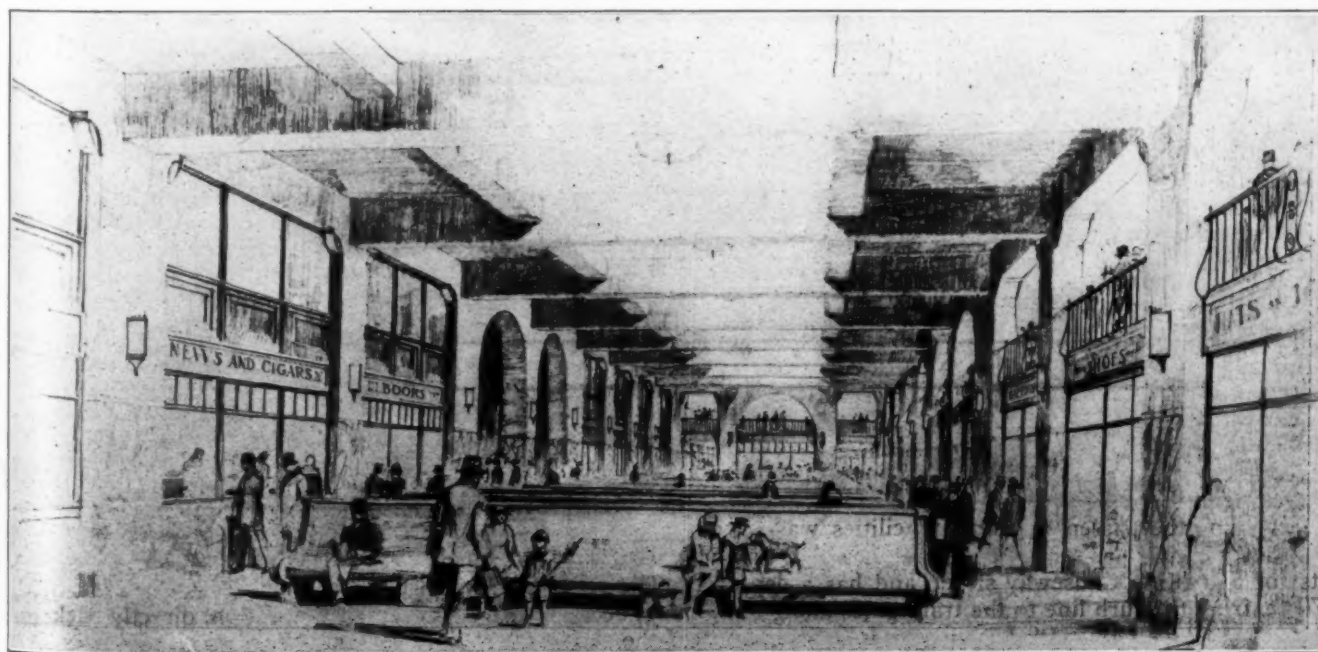
Cross Section Through the New Station—Coliseum Building

The main body of the room, which is entirely clear of columns, is occupied solely by oak back-to-back settees placed transversely across the floor area. These settees, of which there are 16, provide seating capacity for approximately 500 people.

The mezzanine floor, which extends around the waiting room on all four sides, is at a level 11 ft. above the waiting room, and is connected with it by wide stairways at each end. This floor is occupied by a large number of public and private facilities which are

areas. The front section of the floor, which includes over 4,000 sq. ft. of floor space, is given over entirely to concessions and shop areas, while the rear side of the mezzanine floor, toward the train concourse, is occupied mainly by a stock room, an employees' locker room, a large parcel room directly above the similar facility on the main floor, and an accounting office directly above the ticket office.

The interior of the waiting room, while relatively plain in architectural treatment, is highly attractive and



Architect's Drawing of the New Station's Waiting Room

of such a nature that it can be readily kept clean. Above a marble wainscoting, 7½ ft. high, the walls, columns and ceiling are plastered and painted, the trim is of oak, and the floors throughout are of terrazzo tile. Breaking the plainness of the interior are the ornamental wall and ceiling lighting fixtures provided, the glass and bronze-color metal fronts of the shops and station facilities, and the ornamental iron railing which surrounds the mezzanine floor on three sides.

Train Concourse is Spacious

The train concourse, which is 67 ft. wide by 480 ft. long, extends directly behind the waiting room, across the stub ends of the tracks serving the terminal. At the east end are located baggage facilities on both the main floor and on the mezzanine floor, and in addition, one of the lobby entrances and separate ramp entrances to both the elevated railroad and the coliseum level above. At the west end the concourse extends beyond the waiting room, back of the proposed hotel area, to a wide opening on a proposed new thoroughfare, where passengers will be able to reach the street, and where taxicab service will be maintained. At this end also is an entrance to the west end lobby and to ramps to the elevated railroad and to the coliseum. In addition, centrally located in the concourse, is a wide stairway leading to the coliseum level, beneath which space is provided for a news stand, a transfer office and storage space for wheel chairs. Eventually, cafeteria and dining room facilities will also be located in this end of the concourse, it being the plan to locate these facilities on the main floor of the hotel when built, with direct access from the train concourse.

Throughout the first 50 ft. in the width of the concourse, from the waiting room side, the ceiling is 22 ft. high. Beyond this point, for the remaining 17 ft. in the width of the concourse, the ceiling is dropped to a height of about 7½ ft. above the floor, and the area above is enclosed to form an overhead baggage-trucking bridge. This bridge is joined to each track plat-

form by a trucking ramp, and leads directly to the baggage rooms at the west end of the concourse. All of the baggage ramps are of steel and concrete construction and are built on a seven per cent grade. Through this arrangement, all cross trucking of baggage is carried overhead where it does not interfere with the movement of passengers, and the amount of platform trucking is reduced to a minimum.

Two longitudinal rows of columns, at 40-ft. centers, support the trucking bridge, but only the inside columns extend into the concourse area. For architectural effect, these columns are joined overhead by a closed arched panel forming the inner side of the enclosed trucking bridge, each of these panels being provided with a center ornamental grillage, designed primarily to admit light and air to the bridge.

The outside row of columns supporting the bridge lies in the plane of the glazed steel panels and train gates which form the outer limit of the concourse. Back of the train gates, the north side of the building overhangs the station tracks and platforms a distance of about 30 ft. This was done to give added area to the arena floor above. In order to take care of engine smoke under this arrangement, the cover over the tracks was given a sloping ceiling with a pitch corresponding with that of the seat banks of the arena floor, and a horizontal false ceiling, slotted directly over the center of each track, was provided to keep smoke from blowing back on to the track platforms and into the station.

For the most part, the track layout at the station required little alteration, there being 23 tracks, 22 of which are grouped in pairs with 12-ft. centers, each pair of tracks being separated by low concrete platforms, 19 ft. wide. Previously, these platforms were covered by a large train shed, 200 ft. long, beyond which the remaining length of the platforms was protected by butterfly-type sheds. In the new arrangement, the old trainshed was removed and the butterfly sheds were extended to the new station building line.

The coliseum above the station, which is now near-



With the Coliseum Floor Practically Completed, Work Has Been Rushed to Complete the Station Facilities Beneath

ing completion, will be one of the outstanding convention and exhibition halls of its kind in the country. In the center is an arena 250 ft. long by 125 ft. wide, which is flanked on all sides by a deep bank of seats and by two balconies, having a total seating capacity of approximately 14,000. In addition to this regular seating capacity, the hall will accommodate 4,000 additional seats on the arena floor for exhibitions requiring only a small area.

Throughout, the coliseum section of the building is of steel and reinforced concrete construction, the walls, floor and seat banks being of concrete supported on structural steel. In the concrete, a 1-2-4 mix was used in the floors and walls, while a 1-1½-3 mix was used in the seat banks and balconies. All of the concrete was mixed in a central mixing plant near the end of one of the station tracks, and was hoisted up an Insley steel tower, 140 ft. in height, from which it was chuted into place or to concrete carts for distribution.

The roof structure of the coliseum consists of a series of clear span trusses with broken upper chords, having a maximum height of 90 ft. above the floor level. The roof cover is made up of precast gypsum slabs, three inches thick, waterproofed, and underlaid with a one-inch slab of Acoustex, a special composition board designed to improve the acoustics of the hall. Beneath the seat banks of the main floor, the large area provided is divided into a large number of rooms and segregated areas for ticket offices, passageways, toilet facilities, concessions, dressing rooms, etc.

Plans for the completed coliseum call for an elaborate lighting system, and an unusually effective hot-air heating and ventilating system. In this latter system, all piping will be carried over head to large blower fans installed between roof trusses, which will supply either heated or cooled air to all parts of the hall. Other special piping in connection with the hall includes a 20-in. brine pipe which extends from an ice plant northeast of the building, where brine will be furnished for the ice-making equipment which will be used to convert the arena floor into a skating ring when desired.

One of the special features in connection with the new station building is the effective arrangement of ramps provided for handling large crowds to and from the coliseum, and from the train concourse to the elevated railway in front of the building. These ramps are arranged in two groups of three each, the separate groups being located directly back of the tower-like structures at each end of the building.

A study of the ramps, shown in the plan of the station level floor, shows that each group provides a direct route connecting the train concourse with the elevated railroad station, a route connecting the street level in front of the building with the arena level, and another route joining the train concourse with the arena level. None of these routes intersect at any point, so that street crowds to and from the coliseum will be entirely segregated from patrons of the Boston & Maine. All of the pedestrian ramps which are of concrete, are on grades of approximately 12 per cent or less and range in width from 10 ft. to 13 ft. While these ramps form the main entrances and exits of the coliseum, numerous other passageways and fire escapes are provided for use in cases of emergency, so that it is estimated that a capacity crowd can be entirely cleared out in as short a time as eight minutes.

Freight and exhibition entrance to the coliseum is being provided through the second floor of the industrial building to the east, which will be joined to the arena level by an enclosed bridge. This floor is to be

leased by the company operating the coliseum, and will have ramp connection with side track facilities at the rear of the building.

Construction Causes Little Inconvenience to Patrons

One of the most interesting and difficult problems in connection with the new North station has been that of carrying out the work of wrecking and construction while maintaining temporary facilities to handle the regular passenger business. This problem was solved by concentrating all of the passenger station facilities in the old Lowell station at the west end of the old layout, where the new hotel will be built, and by constructing a heavy timber head house over the platform at the ends of the station tracks. With these temporary facilities, the patrons of the road were entirely protected while wrecking and construction work were under way, and aside from congestion at times, both within the temporary station facilities and on the station tracks, were put to only a minimum of inconvenience.

All of the work in connection with the new station and coliseum is being carried out under the general direction of W. J. Backes, chief engineer of the Boston & Maine, and under the direct supervision of F. C. Shepherd, consulting engineer of the road. The architects on the station facilities and the exterior of the station building are Fellheimer & Wagner, New York City, while the Funk & Wilcox Co., Boston, is in charge of the architecture and design of the coliseum. All of the actual construction work is being carried out by Dwight P. Robinson Co., Inc., New York City, under the direction of B. S. Thayer, superintendent of construction of this company.

Illinois Central Derailment Caused by Pipe Falling from Car

THE INVESTIGATION into the Illinois Central derailment at Mounds, Ill., at 3:12 a.m., on August 6, when passenger train No. 3 left the rails and sideswiped passenger train No. 16, killing 8 and injuring 144 persons, as described in the *Railway Age* of August 11, shows that this accident was caused by a train striking a length of cast iron sewer pipe, 12 in. in diameter and 16 ft. 4 in. long, which fell from I. C. car 209125. This car, which originally contained 69 sections of pipe and 4 pieces of pipe fittings from Birmingham, Ala., arrived at Mounds at 10:10 p.m., on August 5 and was forwarded in train No. 276 which departed at 12:15 a.m. on August 6. On arrival in the yard at Mounds the train was inspected by two experienced car inspectors, both of whom report that they flashed their lights to the top of this and other cars, but did not notice anything wrong. The train was again inspected before its departure by two other inspectors who did not detect anything to which exception could be taken.

After securing its bills, train No. 276 pulled up the lead to the north end of the yard, waited about 20 minutes for train No. 4 to pass and followed it out of Mounds. All members of the crew of No. 276 state that there was no rough handling incident to pulling out of the yard. A flagman walked over the top of the train as it was leaving Mounds and released the hand brakes on the car carrying the pipe. In doing this he walked over the pipe in this car and reported that nothing attracted his attention—all pieces seemed to be secure. The car was the tenth from the engine and the

ninth from the caboose. It appears that one section of pipe fell from the car to the ground between the two main tracks approximately 3,900 feet after the train entered the northbound main.

Car Loaded According to Rules

The car appears to have been loaded in accordance with the A. R. A. loading rules. Although Rule 252 permits two tiers of pipe in pyramid form above the sides of the car, in this instance there was only one row of pipe above the top of the car and it was well within the sides. Rule 252 does not require stakes or wiring and neither was used on the load. A check of the contents of the car on arrival at East St. Louis, showed that it was one piece of pipe short on its arrival there. It was further apparent from marks on the inside of the car that some of the pipe had shifted horizontally.

The next train passing through Mounds was southbound passenger No. 203 which was due at Mounds passenger station at 2:47 a.m. When passing the point where the pipe was later found, the engineman of this train said that he heard a noise that sounded like the explosion of a torpedo and he reduced speed. His fireman, who was sitting on the seat box, saw a flash of fire at the front end of the engine near the pilot.

When train No. 203 stopped at the passenger station at Mounds both men alighted and inspected the pilot of the engine, finding a mark on the left corner, indicating that it had struck something. However, neither of the men took any action until their arrival at Cairo Junction at 2:47 a.m., when the train was met by the night roundhouse foreman at Mounds, to whom the engineman pointed out the marks on the pilot. The foreman ran immediately to the tower and reported the incident to the dispatcher who tried to get in touch with someone at Mounds and finally, at 3:05 a.m., established communication with the yard clerk who with the assistant yardmaster at once boarded a switch engine and started for the north end of the yard. In the meantime, the fireman of train No. 203 went to train No. 16, northbound, which was also standing at Cairo Junction, and told the engineman of that train in the presence of the fireman that No. 203 had struck something near the north end of Mounds yard and warned him to look out for it.

No. 16 left Cairo Junction at 3:00 a.m., and passed through Mounds yard before the switch engine with the yardmaster had started north to look for the object struck. The engineman on No. 16 reduced speed to 15 miles per hour through Mounds yard, but came upon the pipe 2,000 feet short of its reported location and struck it before the train could be stopped.

As soon as No. 16 came to a stop the engineman alighted, but saw No. 3 southbound, traveling 55 to 60 miles per hour, approaching so close that he could not flag it and he climbed back into the cab. Train No. 3 derailed immediately afterward, lunging into the side of train No. 16, striking it first at the rear of the second car from the engine and sideswiping all the following cars in No. 16 except the rear one.

The evidence indicates that the piece of pipe was laying at an angle between the two main tracks, with the spigot end against the east rail of the southbound main track and the bell end close to the west rail of the northbound main track; that No. 203 struck the end of the pipe next to the southbound main track and shoved it so that in all probability the bell end was laying across the west rail of the northbound main track when No. 16 struck it. This train shoved the pipe against the west rail of the southbound track and

knocked the track out of line a maximum distance of 7 in., for approximately 38 ft., immediately in front of train No. 3.

Western Roads File Brief in Class Rate Case

WESTERN trunk line railways filed a brief with the Interstate Commerce Commission on August 15 in support of their pleas for a revision of the class structure (I. C. C. docket 17,000, ex parte 87, sub. 1). This investigation, which was originated by a petition filed by the roads with the Interstate Commerce Commission on November 19, 1925, has continued at intervals from January 25, 1927, to May 2, 1928, hearings having been held at Omaha, Neb., Kansas City, Mo., Fargo, N. D., Sioux Falls, S. D., Lincoln, Neb., Denver, Colo., St. Paul, Minn., and Chicago. Western Trunk Line territory includes the states of Wisconsin, Minnesota, Iowa, Kansas, Nebraska, North Dakota, South Dakota, the northern peninsula of Michigan, Northern Missouri, and the eastern section of Colorado and Wyoming. The principal railways operating in this territory are the Chicago & Alton, the Chicago, Burlington & Quincy, the Chicago & North Western, Chicago Great Western, the Chicago, Milwaukee, St. Paul & Pacific, the Minneapolis & St. Louis, and the Minneapolis, St. Paul & Sault Ste. Marie, all of which have 75 per cent or more of their mileage in these states; the Chicago, Rock Island & Pacific, the Great Northern, the Illinois Central, the Missouri Pacific and the Wabash, which each operate more than one-half of their total mileage in this territory; and the Atchison, Topeka & Santa Fe, the Missouri-Kansas-Texas, the Northern Pacific, and the Union Pacific System, which each operate more than one-quarter of their total mileage in Western Trunk Line territory. The increase in class rates in Western Trunk Line territory sought by the carriers will amount at the maximum to not more than \$24,000,000 a year.

In denying a general five per cent increase in freight rates to the Western lines some two years ago, the Interstate Commerce Commission stated that "Class rates in Western Trunk Line territory are admittedly on a materially lower level than those in the Southwest, or in any other section of the Western District. The least favorable conditions in the West, so far as carrier revenues are concerned, appear to exist in Western Trunk Line territory." The present brief has been filed with the Interstate Commerce Commission in support of the railways' petition to correct this situation of abnormally depressed class rates.

In summing up their case, the railways state that their testimony has adequately shown that Western Trunk line earnings are now and have been for a number of years so low that the ability of these roads to raise the capital necessary for maintaining adequate service has been materially impaired. This failure to earn adequate returns has not been due to inefficient and uneconomical management, for the roads have shown that they have followed a persistent and effective program of efficiency and economy. It is felt that these efforts at economy cannot go sufficiently further to improve net earnings to any great extent, especially in the light of increased taxes, rising labor costs, and the continuing high prices of fuel, materials and supplies. It is not in the public interest, the railways feel, for them to continue under such a handicap, nor is it consistent with their constitutional rights for the regulating authorities to hold them to a level of rates which has proved insufficient.

Prompt Handling Reduces Cost of Transportation



A Double-Track Main Line Aids the A.C.L. in Moving Citrus

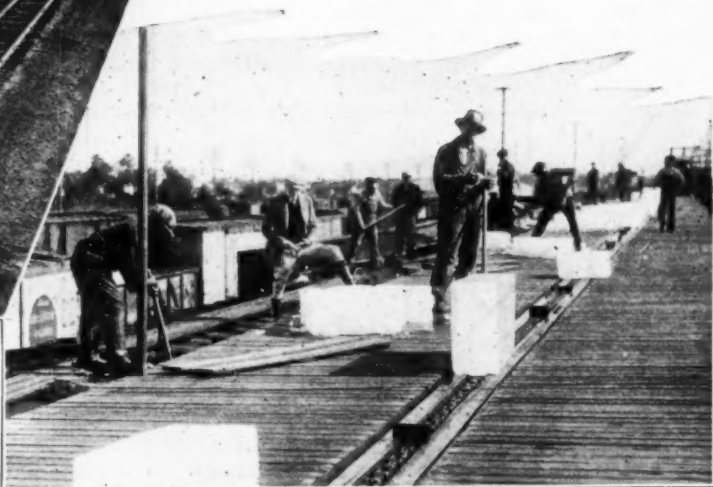
BETWEEN 30,000 and 40,000 cars of citrus fruit are moved out of Florida annually by the Atlantic Coast Line. On account of the semi-perishable nature of the traffic and the necessity for placing it on the designated market in the quickest possible time, the Atlantic Coast Line has worked out an efficient system of train schedules which insures the movement each night of every car of oranges or grapefruit that has been loaded along the line during the day. Moreover, these schedules provide for making the same day's market in the consuming centers with all citrus fruit loaded on any particular day in the state of Florida.

Much has been done in the way of reducing claims and satisfying the shippers by a rigid adherence to these schedules. There remained, however, the question of bad order cars which were responsible for many claims. The bad order situation has been materially improved by a systematic inspection, described in detail later, which practically insures the good condition of all empty refrigerator cars delivered to citrus fruit shippers for loading. Naturally, it is impossible to eliminate entirely defects occurring after the car has been loaded and is on its way north. However, the inspections given are so thorough that such defects are small in all but exceptional cases. Usually, if it is necessary to cut the car out, the repairs can be made in a few minutes and the car goes forward on a following section of the same train.

There are 354 citrus packing houses on the Atlantic Coast Line in Florida. The producing territory extends from Collier City and Immokalee on the south to Palatka on the north. The movement of citrus fruit begins about September 1 and continues until about July 1, usually attaining its maximum height in December and January, when from 200 to 300 cars are handled daily. The accompanying table gives some of the details of the movement.

About 95 per cent of the total citrus movement is

Atlantic Coast Line develops fast schedules which eliminate delays on Florida citrus movement



Icing Cars at a Florida Loading Station

handled in refrigerator cars, and about 53 per cent of the movement is handled under refrigeration. The balance of 47 per cent of the total traffic moves under ventilation. Icing stations are situated at Jacksonville, Sanford, Haines City, Lakeland, Trilby, High Springs, and Gillett in Florida. Re-icing stations are located at such points north of Florida as are required to protect the traffic.

The Florida Organization

As may be seen from the accompanying map, the citrus territory is thoroughly covered by the main lines and branches of the A. C. L., this railroad operating approximately 2,000 miles of line in Florida. The majority of this is single track, the longest stretch of double track being 65 miles between Dunnellon and Vitis. There is, in addition, 12 miles of double track

Atlantic Coast Line's Florida Citrus Movement

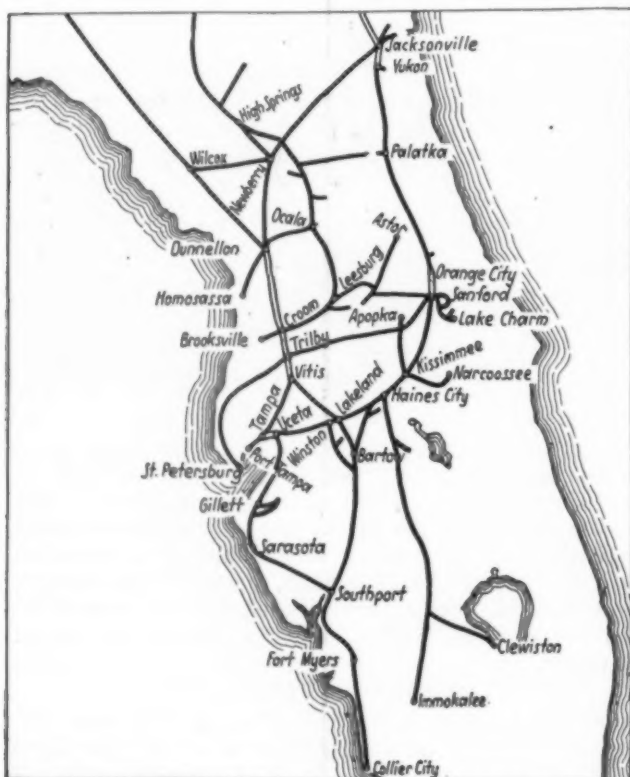
	Cars	Packages
Season 1926-1927	30,441	10,753,476
Season 1927-1928 to March 21, 1928.....	18,582	6,740,391
Five Heaviest Consecutive Loading Dates, Season 1926-1927		
	Total Number of	
	Cars	Packages
December 7, 1926.....	231	80,538
December 8, 1926.....	201	69,233
December 9, 1926.....	269	93,387
December 10, 1926.....	285	99,691
December 11, 1926.....	317	113,930
Five Heaviest Consecutive Loading Dates, Season 1927-1928		
	Total Number of	
	Cars	Packages
January 3, 1928.....	141	50,287
January 4, 1928.....	197	71,248
January 5, 1928.....	236	84,435
January 6, 1928.....	268	96,113
January 7, 1928.....	286	100,943

between Jacksonville and Yukon, 12 miles between Sanford and Orange City and 3 miles between Tampa and Uceta.

The lines south of Jacksonville, High Springs and Thomasville, Ga., constitute what is known as the Third Division, which is divided into five districts for operating purposes. An assistant general manager, with headquarters at Jacksonville, has charge of this division, while a division superintendent of transportation at Jacksonville looks after the car movement.

Car Supply and Inspection

The empty refrigerator cars are supplied by the Fruit Growers Express, which company also takes charge of the icing. In order to determine the number of cars needed, the crop is watched carefully from the time the blossoms appear on the trees. In April of this year, for example, the car company and the railway, by means of a thorough canvass of the citrus groves, were in possession of a reliable estimate of the crop which will begin to move in September. By means of this advance preparation, a sufficient supply of empty cars is kept in the producing territory at all times during



The A. C. L. Has a Large Mileage in Florida

the shipping season. These empties are delivered to the A. C. L. principally through the Richmond gateway. A number of cars, however, are received through the Montgomery, Albany and other gateways. At the height of the season these empties are run south in solid trains. When the demand for cars is not urgent, the empties are used to fill out tonnage on the regular southbound freight trains.

As previously mentioned, the A. C. L. has evolved a system of freight car inspection which insures a high standard of upkeep and avoids accidents. It also facilitates the movement of loads and avoids claims, because, under the system, few loaded cars have to be cut out of trains because of bad order.

All empty cars received at interchange points, as well as those made empty on the system, are given what is called an "A" inspection before they are moved south.

This consists of a thorough examination of the car inside and out. Those cars found to be in first class condition, as well as those that are repaired, are carded "A" Inspection, with the initials of the inspector and the date and place inspected stamped on the card. This inspection card is good for one week and during that period, no other complete inspection is given. Running inspections for air brake, draft gear, truck and safety defects, are, of course, given at each terminal the car passes during that period. If the car is not loaded within a week, another "A" inspection is required before the car can be loaded. After the car is loaded, another complete inspection is given at the first terminal.

The cars are given unusually close inspections at each succeeding terminal. The citrus trains are met by inspectors, who watch the trucks for flat wheels or parts dragging. When the train stops the brakes are set, the engine is uncoupled and a blue flag is placed at the rear of the train. The inspectors then start forward, making both a brake inspection, and an inspection of roofs and running boards. After arriving at the front of the train, they return to the rear, making a safety appliance, truck and draft gear inspection. In the meantime, oilers pass down the train, raising each journal box lid to examine the packing. These men re-pack boxes or change brasses, if necessary. The inspectors make minor repairs, such as renewing nuts or cotters, straightening grab irons or replacing hose gaskets. The work may be started from both ends of the train at once, after the blue flag has been placed.

By this practice of specializing on arrival inspection, it is possible, in nearly every instance where it is necessary to take the cars to the repair track, to make the repairs and send the car out on the same train, or at least on the next section. The terminal yards are equipped with air lines so that, as the outgoing trains are made up, the train lines are coupled, charged and tested, and the engine, after it is coupled to the train, need only make a light application and release the brakes.

The A. C. L. starts its work of inspection and repair at the receiving terminal. When the repair tracks at this point have reached their capacity, cars requiring repairs are tagged and forwarded to the next terminal south for repairs. In no case are the cars needing repairs permitted to reach Florida and interfere with the work of handling the rush movement there.

Florida Operations

The Third division is well equipped with yards, at which the cars of fruit are assembled to be made up into trains for northbound movement. There are large yards at Jacksonville, Sanford, Lakeland and Ucita, with intermediate yards at Gillett, Trilby, Dunnellon, High Springs, Ocala and Haines City.

The principal concentration points are at Lakeland and Sanford. There are two basic trains by which the fruit is handled, Nos. 210 and 212. Train 210 operates from Lakeland, through High Springs and Dupont to Waycross, Ga. The cars are classified before leaving Lakeland as to eastern or western destinations and the cars destined to the west are set out at Dupont and taken from that point by connecting trains, for delivery to western connections.

Train 212 operates from Sanford, via Jacksonville, to the north and west. Classification as between eastern and western destinations is made at Sanford. Most of the sections of this train move through Waycross. However, when a sufficient number of cars for eastern

destinations is available, a train is run from Jacksonville via the Nahunta cut-off, so as to avoid the busy perishable terminal at Waycross. All citrus fruit received from the Florida East Coast at Jacksonville is handled on No. 212.

Originally, all fruit loaded on the A. C. L. was grown in central Florida, in the vicinity of Lakeland and Sanford and on the St. Petersburg branch. As the citrus industry developed and the groves farther south began bearing, the railway has arranged the schedules of its pick-up trains south of Lakeland and Sanford so that all cars arrive in these terminals in time to move out on one of the sections of Nos. 210 and 212. The fruit from the south of Florida generally constitutes the last sections of these trains.

The network of branches north of Lakeland and Sanford is served by pick-up trains, all carefully scheduled so as to fit in with trains 210 and 212. The loaded cars are brought to the junction points of the two main lines. Advance sections are operated from both Lakeland and Sanford to pick up the cars loaded along the main line and brought down from the branches. After filling out to the maximum tonnage, these trains become through trains and are run north as such.

Operations North of Florida

Like other perishables, much of the citrus fruit is reconsigned enroute. The terminal at Waycross, Ga., affords excellent facilities for reconsigning, by reason of its location at the junction of the two lines from Florida and the main lines from the west and north. An efficient reconsigning bureau is maintained to handle the business, and about 60 per cent of the entire movement is reconsigned there.

Sections of Nos. 210 and 212 arriving from the south are broken up there and remade into longer trains for movement north. The A. C. L. has double-track or second main line from Jacksonville to Richmond, Va., and there are practically no grades in the entire distance. The length of trains, therefore, is governed only by operating convenience and the power available. The schedules of Nos. 210 and 212 north of Waycross have been so arranged as to offer the minimum of interference with the heavy passenger movement, which coincides with the shipping season. Concentration of traffic is so great at Jacksonville and Waycross that the movement from those points is largely in solid perishable trains, subject, however, to orders that may be placed for diversion at intermediate points for diverging routes. Little switching is required at Richmond other than that when the A. C. L. brings in a train which exceeds the tonnage that can be handled over the R. F. & P.

Cleveland Terminal To Be Electrified

ALL passenger trains in and out of Cleveland will be handled by electric locomotives after January 1, 1930, the Cleveland Union Terminals Company has announced. The newly electrified zone is to include about 16 miles of multiple track route, extending from Linndale on the west through the new terminal station to Collinwood on the east. A portion of this electric zone will be on the right-of-way of the New York Central and Big Four lines, and the remainder on the Nickel Plate.

The power distribution will be at 3000 volts direct current, with catenary overhead construction. The motive power for the initial operation will include twenty 204-ton geared-type passenger locomotives.

Locomotives

These locomotives are being built jointly by the American Locomotive and the General Electric Companies. They will have capacity for hauling trains weighing 1,275 tons trailing, equivalent to seventeen 75-ton Pullman cars. Each locomotive will weigh 204 tons, with 150 tons on the driving axles. The six geared driving motors will have a total rating of 2,900 horsepower at the one-hour rating, and 2,465 horsepower at the continuous rating. At each end of the locomotive will be a two-axle guiding truck designed to insure successful operation at high speeds. The total length of the locomotive will be 80 ft., and the length of the cab only 52 ft. The running gear will include two, three-axle Commonwealth Steel trucks coupled by an articulated joint and two two-axle guiding trucks, each carrying a weight of about 27 tons.

Motors of Unusual Design

The motors will be of the usual design for articulated truck-type locomotives, being carried at one side on the driving axle and at the other on the transom through a spring nose suspension. Two cushion-type gears will be provided for each motor, one at each end of the shaft meshing with a pinion on each end of the motor. The gear ratio will be 79/29. The control to be used is designated as PCL non-automatic, and includes provision for the operation of two or more locomotives in multiple unit. The master controller has a main handle, a reverse handle and a field control handle, with suitable interlocking to prevent improper handling. The control provides a total of nine running positions and 33 resistance steps.

The main circuits are protected by a high-speed circuit breaker which opens ahead of the main contactors.

Current at 1500 volts is supplied by a 3000/1500-volt dynamotor for driving the blowers and some other auxiliary circuits. Low-voltage power for control, lights, etc., is taken from a control generator mounted on an extension of the dynamotor shaft. This generator supplies about 40 volts for charging a 16-cell Exide Ironclad storage battery. The auxiliaries include two 1500-volt motor-driven air compressors and two 1500-volt motor-driven blowers. Electric heaters and some of the other equipment are also operated from the 1500-volt supply.

The train heating equipment on each unit will include an oil-burning steam boiler with suitable tank for oil and water, similar to the equipment now being used on the passenger locomotives operated by the New York Central Railroad at New York.

The dimensions, weights and ratings of the locomotive are:

Length inside knuckles	80 ft.	0 in.
Length over cab	52 ft.	0 in.
Height over cab roof	13 ft.	2 in.
Height over trolley locked down	14 ft.	10 in.
Rigid wheelbase	15 ft.	0 in.
Total wheelbase	69 ft.	0 in.
Total weight	408,000	lb.
Weight on drivers	300,000	lb.
Dead weight per driving axle	11,800	lb.
Weight per guiding axle	27,000	lb.
Horsepower six motors, continuous rating	2,465	hp.
Horsepower six motors, one-hour rating	2,900	hp.
Tractive effort, continuous rating	23,600	lb.
Tractive effort, one-hour rating	29,200	lb.
Speed, continuous rating	39.2	m.p.h.
Speed, one-hour rating	37.3	m.p.h.
Tractive effort at 30 per cent coefficient	90,000	lb.
Maximum speed	70	m.p.h.
Weight of train handled	1,275	tons.

Public Indifference About the Railroad Problem*

By Glenn Griswold

Chicago Journal of Commerce

THERE appeared here the other day a discussion of the contribution of efficient transportation to business prosperity in recent years. It provoked an exceptional number of letters, mostly from railroad executives. I want to quote one of them because it touches upon a vital phase of public policy that needs attention. J. G. Woodworth, vice-president of the Northern Pacific Railway Company, wrote as follows:

"I always read your column in the Journal of Commerce and often think I would like to talk with you about the railroad situation. What you said recently is especially good, but in the present general condition of numbness with respect to these things, I am wondering how many of those who read these paragraphs will get the full meaning of them. The whole attitude of Congress is wrong, but it is only a reflection of the generally careless feeling of the whole country.

New President Will Have Large Responsibility and Great Opportunity

"The new President will have a large responsibility and a great opportunity. He could easily arouse public interest and influence public sentiment, and his appointments to the I. C. C. to be made in the next two years will come near representing a majority of the members. People were interested in the railroad question a few years ago, and were right-minded about it, but in the absence of car shortages and other disagreeable things, it does not seem possible to maintain this interest. It is also the general impression that the railroads are doing pretty well and that they can stand some rate reductions and that the diversion of some of their business to the water carriers will not hurt them, but we cannot blame the ordinary citizen very much because these suggestions have come from men in high places who were supposed to be not unfriendly to the railroads.

"I wonder what the 'economists' think about the present movement of principal commodities from Chicago to California via Gulf-Panama Canal route, when the Santa Fe Railroad could provide the service at a much smaller cost under the present condition of preponderating eastbound traffic?"

Mr. Woodworth touches a vital point when he says that the public was interested in and right-minded about the railroad question a few years ago, but that in the absence of car shortages and other disagreeable things it doesn't seem possible to maintain this interest.

It seems to me that this is the most important problem of the railroads today. They did the most constructive job in their history when they provided the equipment to give the public the transportation service it enjoys today, and made the effort to command public interest and sympathy. Having gained that interest and sympathy, they have neglected the job too much since. Public interest cools quickly. It must be continuously fanned if it is to be kept warm and responsive.

It would be natural if railroad men resented the fickleness of public opinion. They might be expected to deplore the fact that the public easily forgets the de-

lays and penalties of inadequate service furnished by under-nourished railroads, and soon loses appreciation for betterments of service. But human nature is what it is.

If the new transportation service which saved the business public billions of dollars in inventories and carrying charges, and completely and perhaps permanently altered the buying habits of a nation, had been provided out of the funds of the public and the profits of the railroads, the growing indifference of the public might be better explained. But that is not the case. The billions that were necessary to finance these extraordinary facilities were for the most part provided by additions to the debts of the railroads and by additions to their fixed charges, which means, in turn, by augmenting their necessity of larger earnings.

Public Seems to be Losing Interest

The public seems to be losing what interest it had in these questions, and to be demonstrating little or no appreciation of the fact that it was not their money which provided these facilities. Since 1921 the average freight rate per ton-mile has been reduced 15 per cent. In six years this has reduced the freight revenue of the railroads by \$4,000,000,000 and has saved that much to the public. In the same period the reduction of passenger rates has saved the public another quarter of a billion dollars; and in that six-year period the railroads have somehow raised and added to capital expenditures for service improvements, nearly \$5,000,000,000.

Public understanding of these problems is not spontaneous. Individual observation and the exchange of individual opinion are the worst guides in the world. They develop an individual attitude and a philosophy such as is displayed when a caucus discusses important problems around the base burner in a country grocery store.

The public will read and will have an interest in railroad problems, and will have a sympathetic and constructive attitude toward the railroads, when the message is honestly, directly and simply told, and often repeated. The experience of the public utilities in this regard is ample proof of the point. A few railroads have demonstrated beyond the possibility of controversy that the wise use of printer's ink can solve almost any public policy problem.

* * *



Japanese Student Firemen Being Taught in Groups How to Shovel Coal

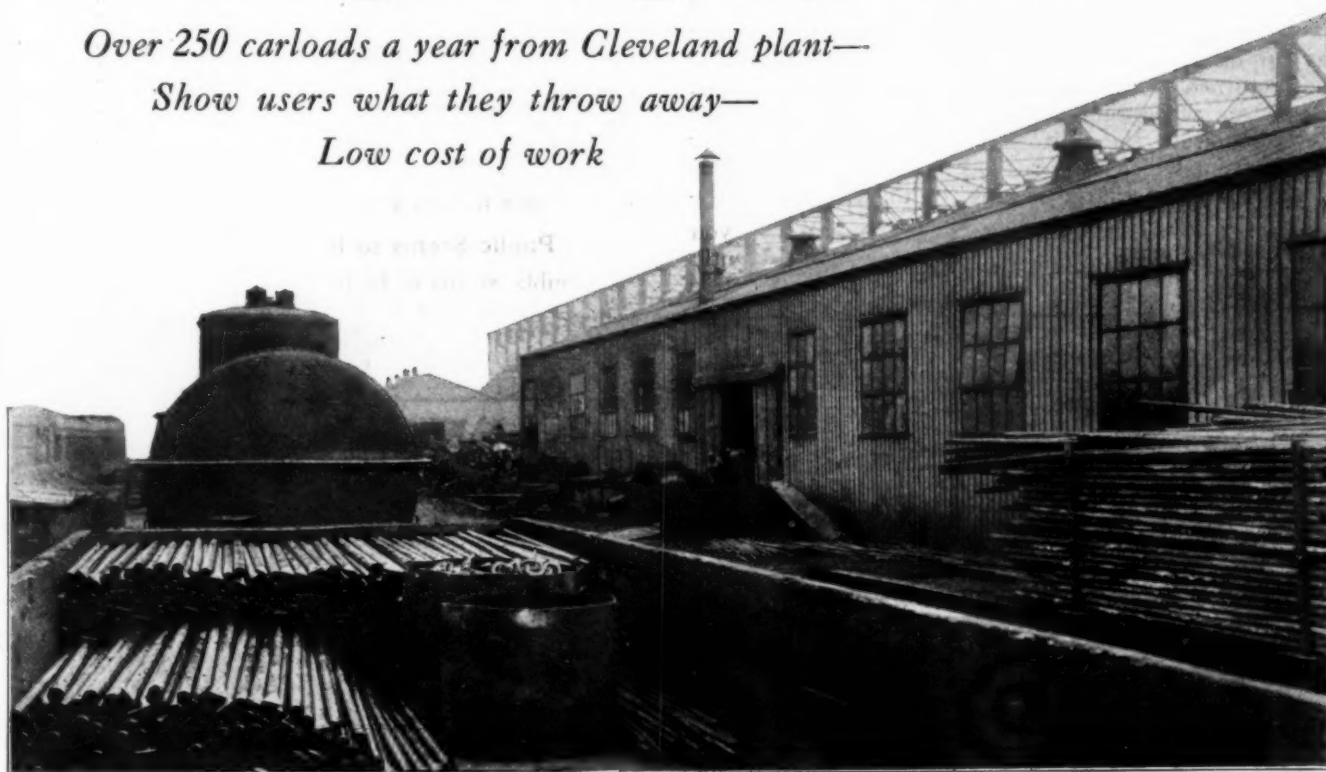
* An article published in the Chicago Journal of Commerce, August 10, 1928.

New York Central Conducts Large Salvage Operations

Over 250 carloads a year from Cleveland plant—

Show users what they throw away—

Low cost of work



Loading Fence Posts Made from Old Flues

AT Cleveland, Ohio, where the New York Central operates what is probably the largest railway scrap handling plant in the world, a plant which produces around 197,000 tons or half the company's yearly output of iron and steel scrap, as described in the *Railway Age* of May 14, 1927, this road also conducts an imposing reclamation operation. In 1924, 5,150 carloads of material, weighing 197,085 tons, were shipped out of the scrap and reclamation yard. A total of 386 carloads of this, weighing 8,872 tons were reclaimed material. In 1925, when the total output was 4,223 carloads weighing 171,498 tons, the production of the reclamation plant was 246 carloads, weighing 6,910 tons. In 1926, when the total output was 4,594 carloads, weighing 195,028 tons, the reclamation mounted to 284 carloads weighing 7,906 tons. In 1927, when the total output was 3880 cars, weighing 171,403 tons, a total of 285 cars, weighing 8487 tons were reclaimed. This is not including serviceable or repairable materials recovered from locomotive dismantling done at this point which produced 1919 tons of such material in 1926 and 795 tons in 1927.

"Savings" Reach Half a Million

In 1927, the total value of the reclamation plant's output, computed at the cost price of new material was \$1,090,045, the cost to the railroad was \$519,434 and the saving determined by the difference, \$570,611. The products of this reclamation operation in 1927, with the quantities of each, the nature of the work done and the value if purchased new, are as follows:

Materials Reclaimed from Scrap, 1927

No. of Items	Description	Value New
46,985 pcs.	Air brake material, miscellaneous	\$45,269
20,480 pcs.	Air brake, angle cocks	22,761
5,308 pcs.	Air brake, cut-out cocks	5,045
1,533 pcs.	Air brake, triple valves	32,290
1,881 pcs.	Air brake, cyls. and reservoirs	19,441
10,190 pcs.	Brass cut-out cocks	10,954
44,377 pcs.	Beams, brake	187,629
57,050 pcs.	Bolts, square head machine	5,347
470 pcs.	Boxes, journal	4,474
57,928 pcs.	Castings, misc. C. I., M. I. and C. S.	50,088
336 pcs.	Chain, wrecking	2,726
3,961 pcs.	Couplers, fitted complete	73,334
87,167 pcs.	Forgings, miscellaneous car	47,051
4,411 pcs.	Gears, draft	160,535
3,086 pcs.	Hooks, clinker	4,630
406,053 lbs.	Iron, bar	7,900
8,070 pcs.	Joints, steam and parts	10,930
182,434 pcs.	Keys, brake shoe	9,121
6,232 pcs.	Knuckles, coupler	29,455
3,480 pcs.	Lever, imperial uncoupling	9,867
3,343 pcs.	Lever, brake	3,481
15,191 pcs.	Lids, journal box	4,768
9,445 pcs.	Lifters, pin	9,445
3,641 pcs.	Locomotive—electrical misc.	4,914
132,066 pcs.	Nipples, pipe (made from scrap pipe)	18,777
11,756 pcs.	Pins, knuckle	3,197
2,709 pcs.	Planks (made from 13 in. channels)	9,666
36,061 pcs.	Shoes, freight car brake	11,539
36,887 pcs.	Signal material	11,821
20,431 pcs.	Springs coil	14,269
85,698 pcs.	Stand switch	105,103
631 pcs.	Tools, misc. hand and track	10,781
16,091 pcs.	Tubes, roadway drainage	14,457
1,863 pcs.	Valves, globe	6,887
11,052 pcs.	Washers, wrought iron	25,571
2,674,793 pcs.	Wheels, brake	8,309
3,881 pcs.	Yokes, coupler C. S.	2,794
1,304 pcs.	Yokes, coupler W. I.	16,137
50,383 pcs.	Miscellaneous M. of W. dept. items	6,087
74,723 pcs.	Miscellaneous M. of E. dept. items	17,665
	Total	\$1,090,045

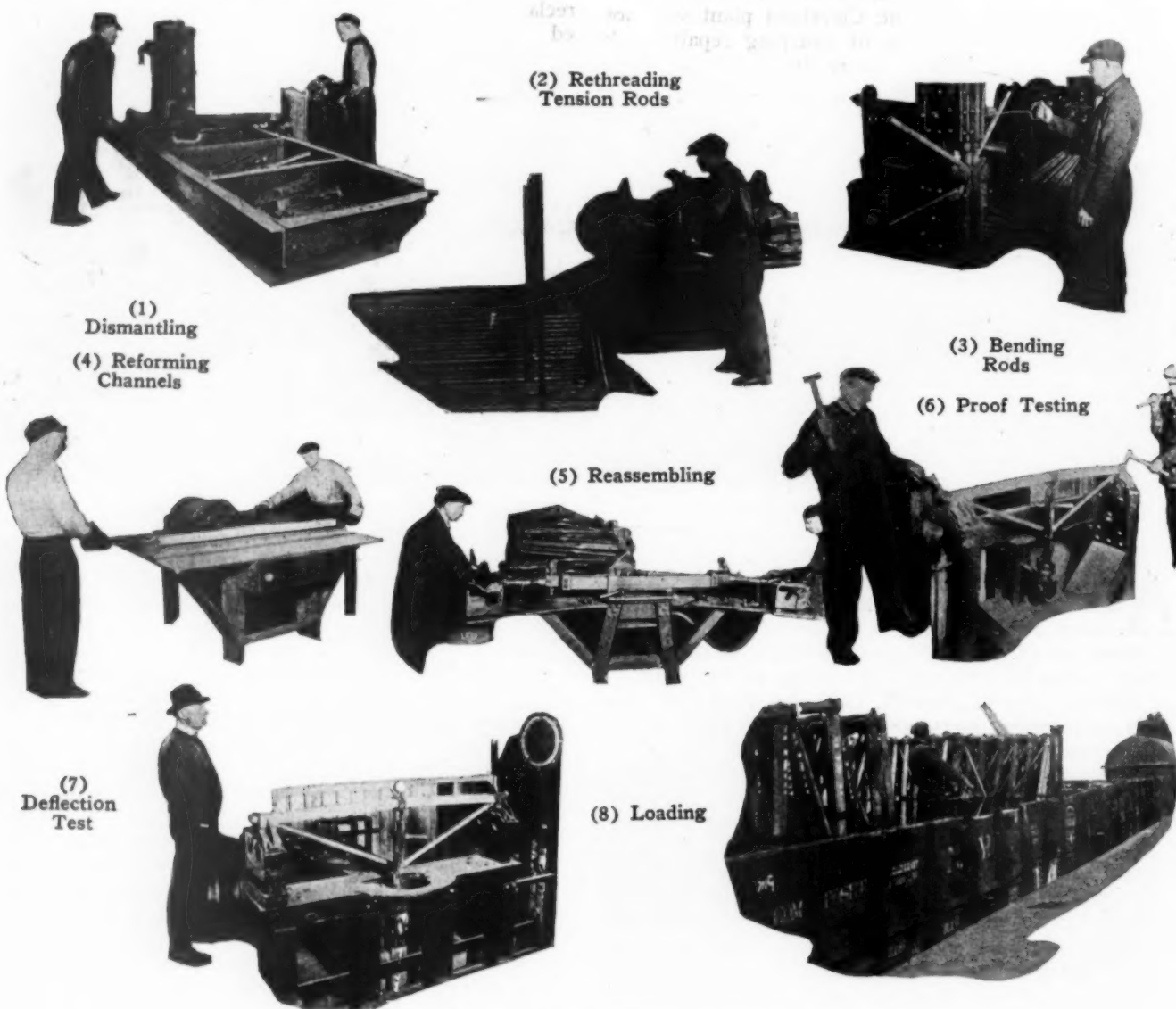
Seek True Cost

Remarks upon the use of the foregoing values of material reclaimed at this plant and the method of deter-

mining the savings are important to a correct understanding of the operation, particularly in view of the widespread skepticism of reclamation accounting. All material shipped out of the reclamation plant is marked up to a value of new material, whether it receives repairs at the reclamation plant, is returned to the railroad or factory for repairs, requires no reconditioning to render it serviceable again, or whether it can be considered merely second-hand material at best; as for instance, freight car castings. The material is not returned to the storehouse at this value, however. From an accounting standpoint, the relation of the reclamation to the railroad is only that of a repair plant, from which the material is delivered to various regions without charge except for the expense of do-

to other shops in making material serviceable by the time it reaches the user's hands. These charges are not itemized and apportioned against each class of material but are kept by accounts, as illustrated in the following statement of reclamation costs for 1927:

Cost of Conditioning for Service	
Labor	
Superintendence	\$24,469
Shop labor	73,900
Sorting and shipping	22,087
Other Than Labor	
Value as scrap of reclaimed material sold	823
Value as scrap reclaimed material for NYC use	122,051
6 per cent interest on valuation	5,149
2 per cent taxes on valuation	1,716
4 per cent depreciation on plant	3,433
Fuel	6,324
Tools and supplies	11,652
Repairs to plant	15,767
Power	2,922
Switch stand parts, new	1,887
Brake beam parts, new	66,943



Steps in Brake Beam Repair Operations at Cleveland

ing the work, as computed monthly and prorated on a tonnage basis. The desire of this road to avoid misleading itself is exhibited by the unusual number of expenses charged against the operation. They cover not only the usual charges for the labor of purely reclamation plant forces and for the new and scrap material used, but also include interest on the investment in facilities, taxes, depreciation, maintenance, insurance, switching charges and hospital expense. In addition, they include the bills for any work delegated

Coupler parts, new	965
Globe valve parts, new	5,909
Miscellaneous parts, new	16,052
Frt. on springs and cartage on misc. material	1,784
Liability insurance and hospital expense	804
Switching and demurrage	1,145
Manufacturer's and NYC shop bills for repairs	
Draft gears	79,654
Springs	29,744
Air brake and other shop bills	24,254
Total Conditioning Cost	\$519,434
Net Saving	570,611

Reclamation plants are the source of much contro-

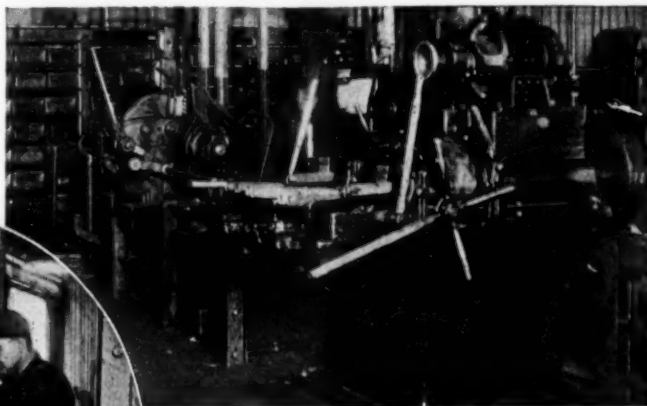
versy and their bookkeeping methods are not the only cause of complaint. It is frequently asked why a railroad should maintain a separate institution in a distant location to do the work which local establishments are already equipped and qualified to do. It is natural that the Cleveland operation should inspire such a question, for this plant is not only removed from the vicinity of any storehouse or shop and remote from many places where its output is used, but also, it is not located on the tracks of the company. As explained in the earlier article, the scrap handling work is done on land belonging to a steel company. It is at this point that the New York Central has erected its own buildings and installed equipment for reclamation work. This it conducts under supervision responsible only to the manager of purchases and stores in New York.

It is pointed out that the Cleveland plant was not established for the purpose of usurping repair work which was being done elsewhere, but is incidental to the handling of scrap at that point. After considerable study, the New York Central concluded that it would be more profitable to ship certain of its iron and steel scrap (about half the total tonnage) to Cleveland and there sort and prepare it for market in a plant provided by a steel company which purchases 77 per cent of the total output. The reclamation plant was evolved to salvage serviceable or repairable materials from that scrap and return it to use. The scrap cars bring some material to Cleveland which would have been recovered at the previous scrap sorting points but this is relatively small as compared with the vol-

ment and machinery added until the present investment for buildings and equipment (not counting land) amounts to \$85,830. Metal buildings extend lengthwise of the scrap yard and are served on the side opposite the scrap yard by a depressed track where all shipping is done. A platform at the end of the building provides storage for repair parts, and ground space is also provided for materials awaiting reclamation, but the operation is organized, as far as possible, to handle the material as fast as it comes from the scrap yard.

A Machine for Every Operation

The reclamation force, while working under the same general supervision, is distinct from that engaged in handling scrap and is limited to 55 men, all working on the New York Central payroll as follows: a general reclamation foreman; a machine shop supervisor, assisted by two machinists; one car man and 15



Making Nipples of Old Pipes



In the Valve Corner



Repairing Air Cocks

ume now salvaged at Cleveland. It is because of what the scrap reaching the Cleveland plant contains that the reclamation activities are carried on. Except in those instances where the operations at the Cleveland plant have been found by special study to justify their repair at that point, track tools, gathered by storekeepers directly from users and not from scrap piles and all reclaimable materials recovered from scrap not shipped to Cleveland, are repaired locally, and in some instances, the Cleveland plant leaves the repairing of items salvaged at Cleveland to others.

Since the plant was started in 1924, it has been increased from 9,000 sq. ft. to 18,000 sq. ft., and equip-

ment and machinery added until the present investment for buildings and equipment (not counting land) amounts to \$85,830. Metal buildings extend lengthwise of the scrap yard and are served on the side opposite the scrap yard by a depressed track where all shipping is done. A platform at the end of the building provides storage for repair parts, and ground space is also provided for materials awaiting reclamation, but the operation is organized, as far as possible, to handle the material as fast as it comes from the scrap yard.

helpers; a blacksmith supervisor assisted by seven blacksmiths, one car man and 15 helpers; and a brake beam supervisor, assisted by three repair men and seven helpers. This relatively small force of men for the output of the plant results from the completeness with which the plant has been equipped with machinery, all of which has been selected and arranged to reduce manual work to a minimum, as well as to afford satisfactory workmanship. The equipment is chiefly second-hand machinery, but includes several new machines and is distinguished by the wide use of direct-connected motors for power. This equipment is as follows:

Machines in Service at the Cleveland Scrap and Reclamation Plant

MACHINE SHOP

- 1 Beaudry hammer, S. H.*
- 2 Bolt Shears, S. H.
- 1 Milford power hack saw, S. H.
- 21 Lathe, S. H.
- 1 Two-wheel emery grinder, S. H.
- 1 Drill press, S. H.
- 1 Washer punch, S. H.
- 2 Bolt threaders
- 1 Six-hole turret lathe, S. H.
- 1 Die Chaser grinder, new
- 1 Two-head pipe threader, New
- 1 Geist roller pipe cutter,
- 2 Two-spindle polisher or buffer, new
- 1 Angle cock grinder, New
- 1 6-T-1 Dexter valve reseater, new
- 1 Reservoir testing table, H. M.†
- 1 Piston testing machine, H. M.
- 2 20-in. Shapers H. M.
- 1 Journal bearing wedge grinder
- 1 POWER HOUSE
- 1 Air compressor, new
- 2 Cooling fans, H. M.

SHEAR SHED

- 1 Punch and shear, S. H.
- BLACKSMITH SHOP
- 1 Drill Press, S. H.
- 3 Spindle, S. H.
- 1 Emery Wheel and stand, S. H.
- 1 Nazel hammer, S. H.
- 1 Air press, 10 in. cyl., H. M.
- 1 Post hammer, S. H.
- 1 Air bumper, 18-in. cyl. H. M.
- 1 Air press 12-in. cyl. H. M.
- 1 Pin lifter
- 1 Link bender, H. M.
- 1 Air press 12-in. cyl. H. M.
- 1 Mahr blower, New
- 1 GE blower, New
- 2 Large furnaces, S. H.
- 1 Miscellaneous heating furnace, H. M.
- 3 Forges
- 1 Brake shoe key furnace, H. M.
- 1 Brake shoe key machine, S. H.
- 1 Large furnace, S. H.

1 Switch stand testing machine, H. M.	1 Bull dozer, H. M.	
1 Nut remover, H. M.	1 Mahr blower, new	
1 Drip pan press, 3-10 in. cyl. H.M.	1 Assembling and dissecting ma- chine, H. M.	
2 Portable oil furnaces, S. H.	1 Dissecting machine, H. M.	
BRAKE BEAM SHOP		
1 Brake beam testing machine, H. M.	1 Brake beam rod bender, H. M.	
1 Portable electric drill, new	1 Two-in Acme triple head bolt cutter, H. M.	
1 Proof load testing machine, H.M.	1 Two-wheel emery grinder, S. H.	
1 Strut press, H. M.	COUPLER SHOP	
1 Brake Beam assembling machine, H. M.	1 Coupler pocket press	
1 Channel press, 12-in. cyl. H. M.	1 Punch press	
	1 Mahr blower, new	
	1 Coupler furnace, H. M.	
	1 Straightening press, H. M.	

* S.H.—Second Hand
† H.M.—Home Made

Hand Book for Inspectors

There is no confusion about what should be reclaimed from incoming scrap. The responsibility for this lies with an inspection corps, comprising a chief inspector,



Typical Car of Reclaimed Material

one leading inspector, three inspectors and one reclamation shop inspector, each of whom is provided with a loose-leaf pocket-size hand book which lists every recoverable item and outlines the inspection each must pass, as determined after conferences by the plant superintendent with using departments.

As rapidly as reclaimable materials are sorted out under the eye of the inspector in the process of scrap handling, they are picked up by a magnet and deposited on trailers, which are taken by tractors, when loaded, to the reclamation area where the material is sorted and either stored outside or taken directly into the shop, depending upon the demand for it. The tabulation reports 36,061 fence posts manufactured from old boiler flues. The flues are cut by an alligator shear in the scrap yard to approximately the correct lengths and moved by tractor to the reclamation plant, where the top ends are cut with a roller pipe cutter which gives the proper finish. The flues are then passed to the drill press, drilled, dipped in paint and loaded directly to an outgoing car where they are counted by a checker as they are loaded for shipment. Bolts which are cut and re-threaded, and washers manufactured from scrap car sides are handled in the same progressive manner.

Rapid Valve Repair

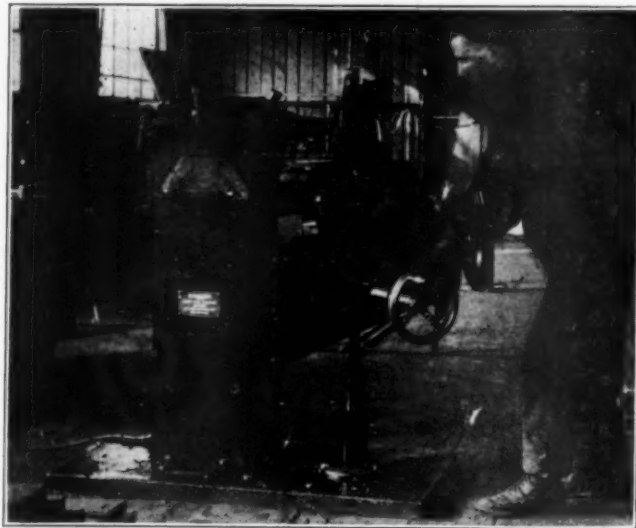
In the air brake corner, by means of a turret lathe which has been equipped to perform five operations, a single mechanic rebushes old angle and cut out cocks

at the rate of 225 a day. Here also, three men repair and regrind cut-out cocks and angle cocks. A workable quantity of the cocks are first sorted out from the mixture on the floor and laid on a bench and the caps removed by a machine improvised from an old air brake cylinder. An air punch then forces out the rivets, freeing the handles. The brass keys are then removed in another machine, those unfit for further use scrapped, and a basket full of the dismantled bodies is thrust into a vat of gasoline to remove the grease.

The bodies accepted by an inspector are then applied to an eight-spindle motor-driven grinder, washed again, dusted off by compressed air, greased, the handles applied and riveted and the caps screwed on. The assembled units are tested in a water bath and the units passing inspection are then painted. The production ranges from 1800 to 2,500 a month.

Large quantities of brass valves and fittings are reconditioned at this plant, the production reaching 11,000 pieces in 1927. After the valves are taken apart, they are dipped into a cleaning solution for a half hour, washed, dipped again, this time in an acid, and again washed, when the repair parts are applied, the valves tested, and then polished in a burnishing machine. With two to four men engaged in this work, the production ranges from 500 to 1200 valves per month.

One of the most recent operations in the plant is the manufacture of nipples from old pipe. This operation began in 1926 with the installation of two new machines, a Geist roller pipe cutter and a two-head pipe threader, both motor-driven. Scrap pipe found in sizes from $\frac{3}{8}$ in. to 2 in., inclusive, is straightened and sheared and brought into the shop, one size at a time. Here it goes from the cutter into pans, according to length, and then to the threader, which threads two nipples at one time. As fast as the nipples are produced they are dropped into pans or trays, where they



Regrinding Contour of Journal Bearing Wedges

await inspection. The production in 1927 was 132,000 nipples, using only two men on the machines.

The oxy-acetylene welding work consists of welding the eyes on pressed steel journal boxes, welding car door material, cast steel locomotive grates and cast steel coupler yokes and building up worn surfaces on

knuckle locks. Proper gages are used, to which the worn parts are built up. In addition to the fence posts made from boiler flues, the only other items manufactured are brake shoe keys, from scrap $\frac{3}{4}$ in. round bar iron, and packing hooks and pinch bars made from scrap springs.

The repair of couplers found in the scrap is one of the largest operations, and a separate shop is maintained for this purpose. Couplers fulfilling requirements for dimensions are brought to a pocket press where the yoke is removed in one operation, after which they are heated in a furnace holding six couplers at a time, and then straightened in another press. It is not the practice of the New York Central to apply patches to couplers or to build up the worn surfaces by the welding torch.

Largest Brake Beam Plant

By far the largest operation of the plant is that of repairing brake beams, a shop having been built and equipped for this purpose, capable of doing the work unusually fast and well. In 1927, 44,400 brake beams were reconditioned for service in this plant. The force comprises 11 men as outlined before. The defective brake beams are dismantled on a table which clamps them while the nut on one end of the rod is removed by an air-operated tool and a punch removes the rivets. The repairable channels are straightened by heating in a furnace and then compressing in a die, while repairable rods are straightened hot, put into a rethreading machine and then passed to a press where they are bent to shape in one stroke. The beams are assembled on a special table which holds the parts in position and under proper tension, while air-operated machines, one at each end, tighten the nuts on the tension rod. After being assembled, each beam is thoroughly tested, two machines being used; one putting the beam under strain to determine its strength and the other testing the deflection under various loads. In these operations, each man has one duty to perform and the work is thus done progressively to secure speed.

Production Controlled

A frequent complaint against independently conducted reclamation operations is the temptation to recover material from scrap which, because of obsolescence is no longer of any use to the road, or to produce quantities in excess of demand. It is emphasized that recoverability or repairability does not necessarily mean usability, and a reclamation operation must be controlled to avoid needless expense to the company. At Cleveland no material is reclaimed or shipped unless there is an order on file for it. The regular order comprises merely a memorandum sheet giving the source of the order, the date, and a description of item, accompanied by a record of the past 12 months' consumption at that point, the quantity on hand there and the estimated requirements for the next 12 months. This slip is the authority to forward such material currently until the requirement is filled or a pink memorandum of the same size is received ordering the discontinuance of shipments. If material is found in the scrap which is reclaimable but for which no orders are held, a yellow colored memorandum of the same size is sent out by the plant, naming the item and calling for information as to the consumption and requirements. By this method reclaiming is done when the material is available and is based on the previous 12 months' use. The reclama-

tion plant is furnished with all drawings and records necessary to the proper repair of articles and receives immediate instructions when these drawings are revised or the use of the article abandoned.

The activities of the reclamation plant are not confined to thorough salvage and harmonious operation with the other departments. Much attention is actually given to keeping serviceable material out of the scrap. A campaign was started in 1926 with the using departments, during which meetings of representatives of these departments were held at the reclamation plant where items of usable material were shown as they came from the cars. At one of these meetings every car foreman from the Lines East was present and at another every car foreman from the Lines West, while separate meetings were held to show shop superintendents, and other responsible officers the actual condition in which material was reaching the plant. Responsibility was fixed by identifying the cars in which serviceable material was received at the plant and the shipping point from which each car came, the effect of which was to surprise officers with the carelessness of men in their own employ. The campaign, once begun, was so fruitful of results in reducing the amount of usable material getting into the scrap that supervision of this character continues to be exercised.

The reclamation plant, together with the scrap handling plant, is operated by A. L. Prentice, supervisor of scrap and reclamation, and under the general supervision of C. C. Dibble, general supervisor of stores and W. C. Bower, manager of purchases and stores.

Committee Pronounces Denver Rates Satisfactory

THE CHAMBER of Commerce of Denver, Colo., following an exhaustive survey, has announced that the rates to and from that city are, in general, satisfactory. This unusual report was rendered following a comprehensive study of the local rate situation, both as to rates into and from Denver and vicinity, and from the standpoint of the community at large.

A questionnaire was sent to 715 Denver companies, including manufacturers, wholesalers and retailers, asking them for detailed information as to the rates affecting their particular businesses, and also for suggestions and complaints. Among the 117 replies, only 33 complaints as to rates were received. Of these, 2 maintained that the carload minimum weights on certain commodities were too high, 3 asked for lower classifications on other commodities and 28 were regarding alleged high rates. In 11 of the 33 cases, the chamber's committee found that no reasonable grounds for complaint existed. In 3 cases, the question is now before the Interstate Commerce Commission, while 4 other cases dealt with alleged discriminations in rates to Denver from the East, as compared with rates from the East to the Pacific Coast via the Panama Canal. The remaining 15 cases have been taken under advisement by the committee and will be handled with the railways if investigation develops grounds for complaints.

Commissioner Dickson of the chamber points out that the small number of specific complaints may be looked upon as depicting a generally satisfactory condition.

800-Horsepower Distillate-Electric Cars for Rock Island

THE Rock Island Lines, which undertook a program of motorizing their light traffic lines about five years ago, will shortly add three 800-horsepower distillate-electric cars to their equipment. These cars, the most powerful units so far considered, will be postal car conversions, each equipped with two Electro-Motive-Winton, 400-horsepower distillate-electric units. They will be used in local and mixed freight service, as well as passenger service, on local and main lines. At the same time, the Rock Island Lines are obtaining eight more single-end, 275-horsepower distillate-electric railway cars, and three Mack two-unit 240-horsepower gasoline engine cars.

Motorization of the equipment was started five years ago with two General Electric, gas-electric cars. Four cars provided with electric drive in 1925 were conversions of McKen mechanical-drive cars, with Electro-Motive-Winton 200-horsepower engines and General Electric equipment. Seven cars were added in 1926. Five of these were new cars, with 275-horsepower engines burning a low-grade distillate fuel. The other two were 40-foot postal car conversions each with two 275-horsepower engines, or a total of 550-horsepower. These engines also burn distillate.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended August 11 amounted to 1,044,442 cars, a decrease of only 5,197 cars as compared with the corresponding week of last year but a decrease of 58,218 cars as compared with 1926. The Allegheny, Central Western and Southwestern districts showed gains as compared with last year while the others showed reductions and decreases were reported in the commodity

classifications with the exception of grain and grain products, ore and miscellaneous freight. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

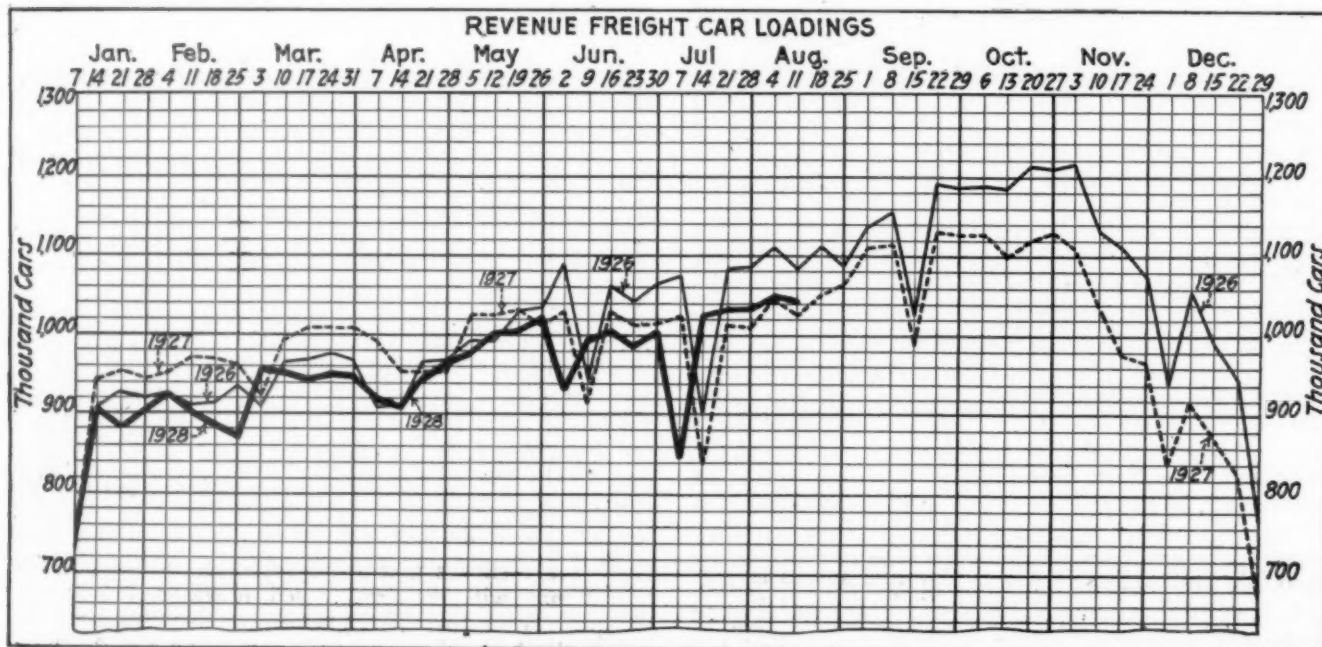
Week ended Saturday, August 11, 1928.			
Districts	1928	1927	1926
Eastern	239,332	240,513	250,829
Allegheny	212,762	210,705	223,600
Pocahontas	57,593	62,950	61,617
Southern	143,353	149,715	150,845
Northwestern	157,121	159,714	173,788
Central Western	154,827	150,499	161,224
Southwestern	79,454	75,543	80,757
Total West. Dists.	391,402	385,756	415,769
Total All Roads	1,044,442	1,049,639	1,102,660
Commodities			
Grain and Grain Products	58,022	53,611	57,169
Live Stock	23,639	27,394	30,479
Coal	161,224	171,108	192,868
Coke	9,337	9,747	11,296
Forest Products	66,295	68,312	72,039
Ore	60,551	59,699	79,301
Mdse. L. C. L.	256,921	259,421	257,849
Miscellaneous	408,453	400,347	401,659
August 11	1,044,442	1,049,639	1,102,660
August 4	1,048,622	1,024,038	1,075,392
July 28	1,033,976	1,044,697	1,095,997
July 21	1,033,816	1,012,585	1,078,193
July 14	1,024,534	1,017,394	1,076,372
Cumulative total, 32 weeks	30,493,100	31,508,478	31,659,402

The freight car surplus for the period ended August 8 averaged 257,212 cars, a decrease of 13,805 cars as compared with the preceding period. This included 84,208 coal cars, 130,479 box cars, 21,396 stock cars and 11,847 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended August 11 totalled 66,009 cars, a decrease of 1,468 cars from the previous week and an increase of 2,773 cars over the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
August 11, 1928	66,009	38,308
August 4, 1928	68,477	38,380
July 28, 1928	69,208	37,743
August 13, 1927	63,236	36,066
Total for Canada		
August 11, 1928	2,067,427	1,241,821
August 13, 1927	1,942,172	1,212,983
August 14, 1926	1,840,580	1,189,309



Why Blame the Stoker?

Entire change in firing conditions demands change in grates—Then stoker will equal or better hand-fired economy

By F. P. Roesch

Sales Manager, Standard Stoker Company, Chicago

GIVE a dog a bad name," etc. The locomotive stoker has had a hard row to hoe, and has shouldered many burdens that justly should have been placed elsewhere, simply because it had a bad start.

It is, perhaps, unfortunate that the first workable stoker embodied no crusher and, therefore, used screenings, and also that it had a relatively high delivery; but more unfortunate insofar as the stoker's reputation as an economical device is concerned, was the fact that it was tested and used on locomotives designed for, and adapted to, hand firing. Had we appreciated at that time what we are now learning, the chances are that the stoker would never have gotten the black eye that some still persist in seeing, even though the discoloration has long since disappeared.

Perhaps a word in explanation of the above paragraph may not be amiss. We know that we need about 11 lb. of air to burn 1 lb. of bituminous coal; therefore, in designing grates we figured on plenty of air opening, the usual grate being the finger type, some interlocking, some abutting, and some grates within grates, with a ratio of from 35 to 55 per cent of air opening to total grate area. Air opening? Yes, we had plenty. For instance, assuming, as on a modern locomotive, a total grate area of 100 sq. ft., 35 to 55 per cent of air opening would, if all the openings were assembled, be equal to a hole from 6 to 7 ft. square. A rather sizeable hole we must admit—large enough, if unobstructed, to allow the free passage of all the air required for combustion, and then some.

Why Lump Coal Is Used for Hand Firing

Of course, the holes were not all together, but they were there nevertheless, and the fireman knew it. He also knew that if he left a portion of the grate uncovered, or even only thinly covered, the air under the grate, taking the path of least resistance, would rush to, and through, that part of the grate with cyclonic velocity, not only not combining with the volatiles present, but rather diluting them and reducing the temperature below the combining point so that at least a part of the gasses passed off unburned. Not only that, but the high velocity of that particular air jet, if it can be so called, carried with it any small particles of coal with which it came in contact.

Knowing all this, the fireman restricted the flow of air by regulating the depth of the fire to correspond with the size and number of the air openings—something he could readily do as he usually had mine-run coal with enough lumps in it to keep the fire bed from packing. The fact that there must be lumps in coal used in hand firing was recognized by fuel agents long before it dawned on us that it might be just as well to restrict the flow of air with the grates, and, therefore, in their specifications the amount of contained screenings or fine coal was definitely stated. As an example, we might refer to some of the midwestern

roads using coal from strip mines where, owing to methods of mining, the slack content runs about 65 per cent. When purchasing this coal, the slack is first screened out, then 35 per cent is added to the resultant lump, the final mixture being called modified or railroad lump.

The University of Illinois tests, Bulletin No. 101, 1917, demonstrated that the stack loss had a definite ratio to the size of the coal fired. This is not at all surprising when we consider the type of grate used. Fine coal (i.e., screenings) packs closer than mine run or lump. Therefore, in order that there may be enough air admitted through the fire to support combustion, the fire must be kept loose. This is not difficult with lump or mine run coal, even though the fire is kept quite deep. Screenings present another problem, however, because if the fire is too deep there is an air deficiency, while if too thin, there is a surplus. Not only that, but owing to the difficulty of maintaining a thin fire at a uniform depth over the entire grate, thin spots will develop, and thin spots mean stack loss, as set forth in a preceding paragraph. The fireman at the test plant realized this. Therefore, he kept his fire heavy enough to prevent holes being torn through it. He reduced the stack loss, although he did not get perfect combustion because of air deficiency, as set forth in the test data where it is shown that with a fuel bed not more than 8 in. deep there was not enough air passing through the fire to furnish all the oxygen required for the complete combustion of the volatiles. Had the grates in the locomotive used in this test been better adapted to the use of screenings, we are confident quite different results would have been obtained.

Where the Stoker Got a "Black Eye"

It was at this test that the stoker got its black eye. While subsequent tests on another test plant apparently confirmed the University of Illinois tests and indicated that the black eye was merited, yet in every case the answer was predicated on premises that were bound to lead to wrong conclusions; viz., the stoker was tested on a locomotive designed for, and adapted to, hand-firing methods.

The University of Illinois tests placed the size coals based on evaporation in the following order at different rates of combustion, taking mine run as a base and assuming it as 100 per cent.

	Medium Rates, Per Cent	High Rates, Per Cent
Mine run	100	100
Egg coal	102	105
Lump coal	99	97
Nut coal	98	106
2-in. screenings	93	87
1¼-in. screenings	85	82

The writer believes that a careful check would have indicated that, with the grates used, it was possible to build up a fire of just the right thickness to admit air as required when using egg coal, regulating the depth of the fire to suit the rate of combustion. With lump coal, too much air was admitted. With nut coal, there

was not enough air at medium rates if the fire was carried deep enough to prevent holes, and too much if the fire was carried thin, while at the higher rates this condition was automatically overcome. With screenings, a thin fire resulted in a high stack loss and imperfect combustion because of too much air, whereas, if the fire was built up to a depth that prevented the formation of holes, combustion was not complete owing to the coal packing so close as to partially cut off the required air supply.

Screenings can be fired and burned economically and should, for the same B.t.u. content, give the equivalent evaporation of mine run or any other size coals, provided all conditions are adapted to burn it.

The Stoker Always Fires Screenings

This now brings us to the stoker. We must not lose sight of the fact that, regardless of the size of the coal placed on the tender, it is all reduced to what would be termed screenings when it is finally discharged into the firebox. Therefore, in order to fire any kind of coal economically with any of the locomotive mechanical stokers in use at present, certain parts of the locomotive must be adapted to the use of screenings.

We have shown that screenings will pack and partially shut off the air supply if the fire is carried too deep. This means that with screenings a thin fire may be maintained. We have also shown that if the fire is carried too thin with the grates commonly used, there is a tendency to pull holes through it, resulting in high stack loss, as well as imperfect combustion. Would this not indicate that the design of grate is the first factor in our problem? While the size of the openings through the grates is material, the primary factor is the total number of openings, or the ratio of air openings to total grate area.

The statement has been made that general practice is to have from 35 to 55 per cent of air opening to total grate area. We have as yet said nothing, however, about the openings through, or over the ashpan, through which the air must flow to get under the grates. A check of standard practice shows this to range from 9 to 15 per cent of the total grate area, 14 per cent being the recommended practice. If 14 per cent is enough to meet maximum requirements, why have 55 per cent through the grates? True, the ashpan openings are usually free and unobstructed, while the size of the grate opening, plus the fire bed offers quite a restriction to the free flow of air, but the fuel bed need not, and should not, be of such a depth, or so packed as to offer any marked resistance. Therefore, the proper place to control the flow of air into the firebox should be through the grates.

Adapt the Grate to the Stoker

Let us reason together. Taking, for instance, a percentage of 40 as a fair average ratio of air opening to total grate area, and assuming that the fire becomes quite thin over an area of 2 sq. ft. something not uncommon, we would have the equivalent, neglecting fractions, of 40 per cent of 2 sq. ft., or 115.2 sq. in., or a hole, say, 10 in. by 11 in. The amount of air that can pass through a hole of that size is enough to knock the steam on even a free steaming engine. Consider now a grate adapted to screenings, such as is used on the Atchison, Topeka & Santa Fe or Northern Pacific, having small round holes, the total air opening to total grate area being equal on the first named road from

14 to 18 per cent, and on the latter, from 12 to 14 per cent. Taking 14 per cent as a mean and assuming the same firebed condition as before, we would have 14 per cent of 2 sq. ft., or 20.16 sq. in., or a hole 4 in. by 5 in., which is not large enough materially to affect the steaming of the engine, as can be seen by anyone who wants to investigate by simply opening the fire door on any engine equipped with restricted grates where the grates can be seen practically uncovered over much larger grate areas than 2 sq. ft.

In hand firing, when the fireman sees a thin spot forming he immediately fills it up. The stoker has no eyes, however, and if the draft is not equally distributed, or the fireman has not regulated the distributing apparatus so as to get an even spread of coal over the entire grate area, thin spots will develop. Unless the fireman changes the distribution, heat units will be discharged from the stack either in the form of cinders or unburned gases, or both, the loss being directly proportionate to the ratio of air opening to total grate area, and the stoker gets the blame.

Grate and Brick Arch in Fuel Losses

While the grates probably take first rank in fuel losses in connection with stoker firing, there is another factor of almost equal importance; namely, the brick arch. In hand-fired engines it is customary to use a relatively short arch. This is because the long arch has a tendency to throw the flame back so as to make it uncomfortably hot at the door. Therefore, the arch is run short for the benefit of the fireman.

Other Factors Which Help the Stoker

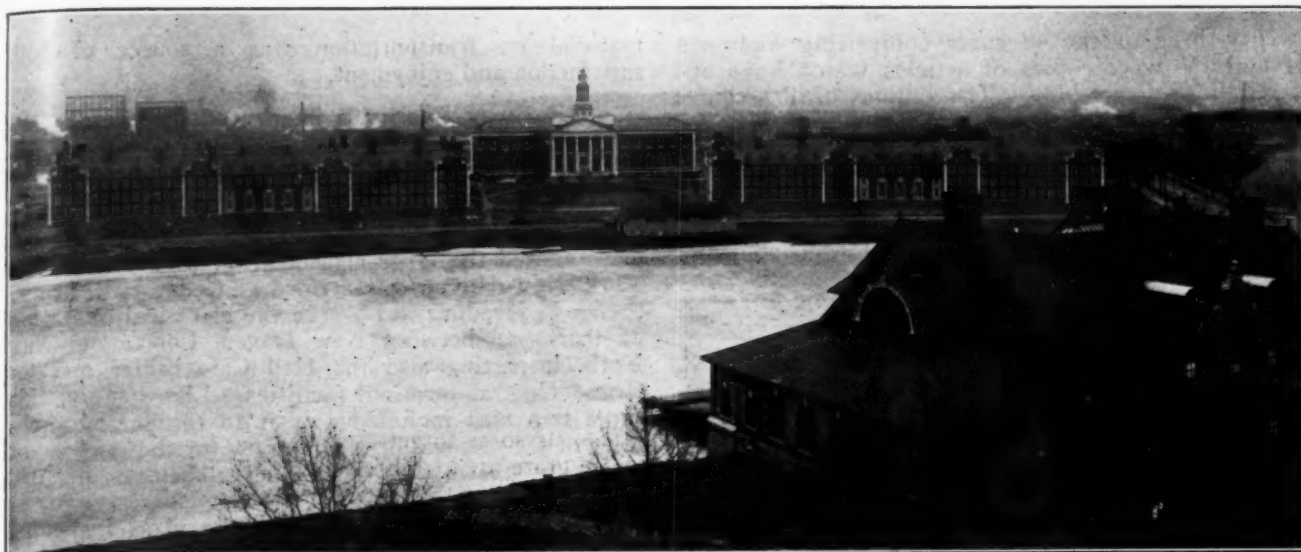
The arch improves combustion. It lengthens the flame travel and reduces the stack loss. The stoker does not mind the heat at the door and, as every foot added to the arch increases the flame length two feet, in this way adds to one of the three T's (time), it follows that each row of brick that is added is a distinct gain.

It might be well at this point to again call attention to the fact that the stoker fires nothing but screenings, and as the production of screenings from lump at the crusher is bound to result in more or less fines ($\frac{1}{8}$ in., $\frac{1}{16}$ in., and dust), the time element is one of the very important ones. The added brick often spells the difference between complete and partial combustion of the fines.

Conclusions

We could go on indefinitely and refer to front-end draft appliances, leaks, etc., and their effect on so-called stoker performance, but while related, these items are not exactly pertinent to this paper which deals primarily with combustion in the locomotive firebox and water evaporation per pound of coal fired.

Therefore, we will simply assert that while all tests have apparently demonstrated that at rates of combustion within the physical capacity of a human fireman, a higher evaporation per pound of coal was obtained than in stoker firing, nevertheless if the locomotive is adapted to burn the coal economically as fired by the stoker, the stoker, if operated with ordinary care, will show a performance in all cases equal to hand firing and, in the hands of a fireman interested enough to look at his fire occasionally, show results that cannot be approached by even expert hand firing, irrespective of the size of the locomotive or the rate of combustion.



A View of Harvard Business School from Across the Charles River

Summer Course for Railroad Men

A Success

27 officers and employees of nine railways complete intensive six-week session at Harvard

OFFICERS and employees of nine railways, representing practically every branch of the service, were among the 30 men enrolled for the transportation course at the special summer sessions for business executives, which was offered between July 9 and August 18 at the Graduate School of Business Administration, Harvard University, Cambridge, Mass. The course was intended primarily for men actually engaged in railroad work and there were no academic prerequisites for admission. Of the 27 railroad men taking the course only four had academic degrees.

It was one of five courses offered by the business school in its effort to extend the direct services of the institution to business. The 1928 session was the outgrowth of a public utility course offered experimentally during the summer of 1927. The enthusiastic response to this latter prompted the university authorities to broaden the scope of the experiment during the summer of 1928 and thus the five courses were conducted.

The transportation course was under the direction of William J. Cunningham, James J. Hill Professor of Transportation, Harvard University, and Winthrop M. Daniels, Thomas DeWitt Cuyler Professor of Transportation, Yale University. The announcement stated the course to be intended for "junior officers and various operating and departmental heads of the railroad companies and teachers of business," and continued to state its object to be "to present the broad economic and administrative problems of the railroads not ordinarily falling within the experience of the specialized duties of the individual department head or junior executive."

For purposes of class work this transportation course was divided into two sections, with Prof.

Daniels leading discussion in the section on rates and regulation, and Prof. Cunningham conducting the section dealing with operation and general administration. All transportation students attended both sections. Sessions were held each morning from Monday to Friday, inclusive, from 8:30 to 10:30 and from 11 to 1.

Case System of Instruction Employed

Instruction procedure was based on the case system which is the method employed at the regular winter sessions of the school. It involves classroom discussion of actual experiences, policies and decisions of business firms and executives who have released this information and permitted its preparation as case material for the various courses. This method enables the student to deduce underlying economic and business principles from the daily experience of business rather than from theoretical text-book presentations. Four volumes of mimeographed sheets setting forth cases were used in the transportation course, two in connection with the class discussions lead by each professor.

Volumes I and II, used by Prof. Daniels, were compiled mainly from decisions of commissions and courts which have become basic cases in the history and development of railway valuation, regulation and rate making policies. A total of 33 cases were included in these two volumes. Volumes III and IV, used by Prof. Cunningham, comprised 48 cases, each a description of some phase of railway operation or policy as actually conducted or inaugurated by some road. Thus the men were dealing with situations such as they meet in their daily work; some, indeed, found themselves familiar with particular cases concerning the road by which they are employed.

Twenty-three of the 48 cases comprising Volumes III and IV were copies of articles which have appeared in *Railway Age*. The outline of the course was published in the *Railway Age*, issue of May 19, page 1174.

Problems were assigned one day for discussion in class on the next. In addition, a few special written problems were assigned from time to time. With the class work ended at 1 o'clock each afternoon, the



Dormitories and Yard at Harvard Business School

remainder of the day was left for reference work and study, in connection with the cases under review, or for supplementary reading. To guide the student in the latter, a list of suitable readings was prepared and distributed by the professors. Also, abundant material for study and research was available at the school library which is stocked with approximately 100,000 bound volumes and more than 500,000 pamphlets on business subjects. That the students of the transportation group took every possible advantage of this material is indicated in comments of the library staff, the chief of which stated that members of the group were most regular and faithful in their library work. The general comment of the railroad men themselves, especially the non-college men, was that the wealth and variety of

material on transportation was a source of both satisfaction and enjoyment.

Railway Facilities Inspected by Class

In addition to regular classwork, with its supplementary study and preparation, the course included three trips for the inspection of railway facilities and observation of operations. On the first of these the class visited the large classification yard of the New York, New Haven & Hartford at Cedar Hill, Conn., thence proceeding to observe the electrical operation of that road between New Haven, Conn., and New York, inspecting also the Hell Gate bridge and the Grand Central terminal facilities. Likewise, on this same trip was included a visit to the Jersey shore lines of the Central of New Jersey for the purpose of observing the summer passenger business of that road.

On the other two occasions, the class inspected facilities of the Boston & Maine; first visiting the new retarder-equipped classification yard of that road and its waterfront properties at Boston; and, later in the course, inspecting its locomotive shop facilities at Billerica, Mass.

Five Branches of Railway Service Represented

As was stated at the outset, nine roads were represented in the course. Three non-railroad men were enrolled with the transportation group of 30 students. They were a teacher of business, a lawyer and a representative of an automotive manufacturer. Of the 27 railroad men, two were from the executive department, 12 from the operating department, six from the accounting department, five from the traffic department and two from the mechanical department.

One of the major benefits of the course, in the opinion of the school authorities, and the students as well, was the opportunity which it afforded for association between men in different departments, so that individual problems of each were more readily appreciated and merged into mutual problems for discussion.

The Boston & Maine was represented by the largest number of men, there being eight representa-



Students in the Transportation Group at the Harvard Summer Session

tives of that road in the course. Also its departmental representation was greatest since its contingent was recruited from four different departments, five from the operating, and one each from the accounting, traffic and mechanical department. Next came the Southern with six representatives, including two from the executive department and the remaining four from the traffic department. The Baltimore & Ohio, the New York, New Haven & Hartford and the New York Central each sent three men, while one man was enrolled from each of the following roads; Atchison, Topeka & Santa Fe; Boston & Albany; Minneapolis, St. Paul & Sault Ste. Marie; and Central of New Jersey. The list of students follows:

Transportation Section

Balch, Henry G., Ass't Yardmaster, B. & M.
Barrett, Walter C., Asst. Supt. Terminals, B. & M.
Booth, Wm. F., Superintendent, B. & O.
Branley, James R., Trainmaster, M., St. P. & S. Ste. M.
Cooper, Jesse A., Div. Frt. Agent, Southern.
Coyle, Hollis H., Production Statistician, N. Y., N. H. & H.
Dorigan, Harry W., Assistant Statistical Acct., N. Y., N. H. & H.
Fairfield, Arthur, Statistician, N. Y., N. H. & H.
Frederick, John H., Instructor, Univ. of Pa.
Gordon, C. F., Trav. Car Agt., New York Central.
Green, Lincoln, Ass't to President, Southern.
Hill, C. S., Trav. Car Agt., N. Y. Central.
Horner, Frederic C., Ass't to V. P., General Motors Corp.
Jenkins, Frank L., Ass't Gen'l Pass'r Agt., Southern.
Kidder, Nelson E., Inspector of Trans., B. & M.
King, Walter M., Commercial Agent, Southern.
Leahy, Ward H., Trav. Car Agent, N. Y. Central.
Looney, Terence C., Chief Dispatcher, A. T. & S. F.
McGuane, Thomas F., Frt. Trainmaster, B. & M.
Massy, George H., Mech'l Inspr., Central of N. J.

Myers, James W., Chief Clerk to Comptroller, B. & O.
Reed, Edward F., Chief Clerk, Traffic Dept., B. & M.
Reynolds, George G., Lawyer (independent practice).
Scott, John E., Sec. to Mech'l Supt., B. & M.
Sears, Fred L., Mgr. Bureau of Statistics, B. & M.
Sweeney, John F., Frt. Trainmaster, B. & M.
Taylor, John L., Head Stat. Clerk, Disb., B. & O.
Toal, Fred, C., Secy. to Ass't to Pres., Southern.
Turner, Wm. T., Ass't Frt. Traffic Mgr., Southern.
Wheeler, Chester E., Statistician, Boston & Albany.

The tuition fee for the six weeks was \$200 with an additional room and board charge varying from \$115 to \$180, depending upon the room selected, for those who elected to live in the dormitories at the school. Of the men in the transportation group, 20 lived in the dormitories. This association afforded these men additional opportunities for evening discussions of problems.

Men Received Leave of Absence With Salary

All 27 railway men received leave of absence with salary from their respective companies. All but two roads paid the tuition and other expenses of their men and one of these latter paid half the tuition.

For recreation, the students, in addition to the use of tennis courts at the school, enjoyed golf privileges at the Oakley Country Club, and Belmont Springs Country Club, which are in nearby suburbs.

One evening each week a smoker was held at which the students were addressed by some prominent business leader. Among these speakers was R. H. Aishton, president of the American Railway Association, who delivered an address on August 14.

Future Possibilities in Claim Prevention Still Great *

Attention must be given to development of claim conferences, statistics and loading methods

By A. L. Green

Special Representative, American Railway Association, Chicago

THE very fact that many classes of claims are now being substantially reduced confirms the belief that progress in reducing the claim account can be continued indefinitely. Claim prevention has to do with the finding of causes, the improvement of existing methods and the finding of new methods. When these methods fail to keep pace with changing conditions, improvement stops. It is not a question whether we are doing good work, but whether we are doing good enough. Will present methods again "cut loss and damage in half"—a result attainable—or shall some of them be scrapped?

We cannot remain static. We must go forward or go back. Assuming it is worth while to re-examine our practice, the logical place to begin is with the claim conference. Although it is the duty of the Committee on Freight Claim Prevention to plan and co-ordinate the general campaign, responsibility for results in the Association work rests squarely with the claim conferences. They control the machinery for giving life to the committee's recommendations. Hence it seems plain that, unless each conference has an adequate program of future activities, designed to get the greatest

return out of its members and the various bureaus, the claim waste will not shrink as fast as it should.

The custom now is to docket only those matters that may be presented currently for consideration, and the work of each conference prevention committee is carried on practically without regard to the work of the other eight or ten similar committees, except in so far as all are giving attention to such general subjects as rough handling of cars and matching of over and short freight.

A single exception is the interlocking memberships on the perishable prevention committees of the Chicago and Eastern claim conferences, which already have tended to avoid duplicate effort and to concentrate on a few important subjects. This and other forward-looking plans of these committees promise exceptional results.

Instead of all the railroads and all the conferences, trying to solve all the problems at the same time with insufficient means to do justice to many of them, would it not be well to consider whether there are not some problems common to all the railroads, or to the railroads of a particular region, which could be apportioned among the conferences for intensive study and for recommendation to the division where that disposition is called for? Would we not get ahead faster

* From a paper presented at the annual session of the Freight Claim Division of the A. R. A. at Detroit, Mich., on June 6.

if those problems were divided among the conferences best able to handle them? In that way, responsibility could be placed for finding the solution. There would be more facts and fewer theories. And a valuable by-product would be the training of specialists whose advice and aid would always be available. In every conference there are prevention departments equipped for working out research problems. A department so engaged would not be limited to its own facilities, but could secure assistance from the engineering or mechanical department, the inspection and container bureaus and the prevention officers of other lines as well as trade associations.

This would not mean any lessening of the routine activities of the individual lines; on the contrary, specialization by one railroad on a problem would be complementary to the work on that problem by all railroads. It would afford a means of concentrating new information, as developed currently, in the hands of the pre-

words more problems would be investigated thoroughly and brought to a conclusion by the present force.

It has been asserted that to assign a research subject to a committee is a sure way to postpone its disposition indefinitely and the costly delay in handling the sewer pipe loading problem is cited as an example. It is granted that there may be some objection on this score; but do we not find an assuring answer in the experience of our great industries and trade associations, many of which handle important research and development problems through committees? This is especially true in the experience of the American Railway Engineering Association which, during the 29 years of its existence, has successfully followed the plan here suggested. To be sure, railway engineering committees have a multiplicity of scientific questions and adverse practices to deal with, but this also applies, on a lesser scale, to the Freight Claim Division. That association now has 24 standing committees with 203 sub-committees having

CLAIMANT AND ADDRESS		AMERICAN RAILWAY EXPRESS COMPANY, INC.		CLAIM RECORD CARD	
DRAFT (MAIL TO IN FAVOR OF CONSIGNEE AND ADDRESS)		BUREAU, DIVISION, AND CLAIM NUMBER			
SHIPPER AND ADDRESS		DATE REGISTERED	AMOUNT OF CLAIM	CLAIMANT'S NUMBER	
DATE SHIPPED	ARTICLE	CONTENTS	WEIGHT	CHARGES	DATE PRESENTED
DELIVERED	WITHDRAWN	PAYD	DRAFT NUMBER	AMOUNT PAID	
NATURE OF CLAIM The original black card is retained in the claim bureau registering the claim and is filed alphabetically by claimants, then alphabetically by consignee under each claimant, and by traffic date under each consignee.					
SALE ORDER NO.		ISSUED	AGENCY	(GRI-6-55) Printed in U.S.A.	

CLAIMANT AND ADDRESS		AMERICAN RAILWAY EXPRESS COMPANY, INC.		CLAIM RECORD CARD	
DRAFT (MAIL TO IN FAVOR OF CONSIGNEE AND ADDRESS)		BUREAU, DIVISION, AND CLAIM NUMBER			
SHIPPER AND ADDRESS		DATE REGISTERED	AMOUNT OF CLAIM	CLAIMANT'S NUMBER	
DATE SHIPPED	ARTICLE	CONTENTS	WEIGHT	CHARGES	DATE PRESENTED
NATURE OF CLAIM The duplicate or green card is sent to the claim accountant who files it alphabetically as to consignee and in date order.					
				(GRI-6-55) Printed in U.S.A.	

CLAIMANT AND ADDRESS		AMERICAN RAILWAY EXPRESS COMPANY, INC.		CLAIM RECORD CARD	
DRAFT (MAIL TO IN FAVOR OF CONSIGNEE AND ADDRESS)		BUREAU, DIVISION, AND CLAIM NUMBER			
SHIPPER AND ADDRESS		DATE REGISTERED	AMOUNT OF CLAIM	CLAIMANT'S NUMBER	
DATE SHIPPED	ARTICLE	CONTENTS	WEIGHT	CHARGES	DATE PRESENTED
NATURE OF CLAIM The triplicate or red card is sent to the claim bureau having jurisdiction over the office at which shipment involved in claim originated, and is filed alphabetically by shipper under each point of origin, by traffic date under each shipper and then alphabetically by consignee under each shipper and traffic date; this affords a complete file on traffic moving from each shipper during a given period.					
				(GRI-6-55) Printed in U.S.A.	

CLAIMANT AND ADDRESS		AMERICAN RAILWAY EXPRESS COMPANY, INC.		ACKNOWLEDGEMENT OF RECEIPT OF CLAIM	
DRAFT (MAIL TO IN FAVOR OF CONSIGNEE AND ADDRESS)		BUREAU, DIVISION, AND CLAIM NUMBER			
SHIPPER AND ADDRESS		DATE REGISTERED	AMOUNT OF CLAIM	CLAIMANT'S NUMBER	
DATE SHIPPED	ARTICLE	CONTENTS	WEIGHT	CHARGES	DATE PRESENTED
This will serve as an acknowledgement of receipt of your claim, details of which, including our file number, are shown herein. The claim will be given prompt attention and it is requested that if you find it necessary to communicate again with reference thereto that you please QUOTE OUR CLAIM NUMBER.					
NATURE OF CLAIM The quadruplicate card printed in black is used as an acknowledgement to claimant by claim agent.					
				(GRI-6-55) Printed in U.S.A.	

Fanfold Card Used by the American Railway Express Company for Recording and Indexing Claims

vention officer or bureau volunteering to carry the project to a conclusion. In many instances it would be necessary to assign a competent inspector to a problem for a month or two at a time; but all this would be compensated by the research work being carried on by numerous other lines for the general benefit and for the use of the particular line which is donating the services of its inspector to the common cause. In this way a single, sound conclusion is more apt to be reached than where the effort on a particular problem is spread out and diluted with so many different ideas and conclusions. The time of many men now engaged in going over the same ground would be released; in other

774 members who are actively engaged in handling approximately 200 different assignments.

If the time for important reform has come, it would seem that a procedure which has stood the test of time, which has contributed so largely to the standing of the American Railway Engineering Association as the leading engineering organization of the world and which seems wholly to meet the needs of the Freight Claim Division, is worthy of our careful consideration. And just another thought—the claim conferences, by materially strengthening their prevention committees, undoubtedly could accomplish a great deal more. There is a place on those committees for the Inspection

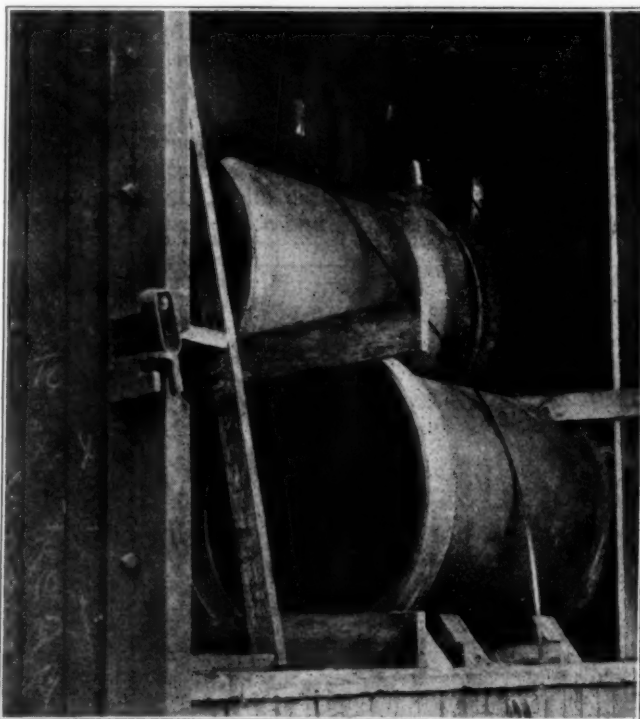
Bureau representative; the engineer (on loading practices); the mechanical officer (on equipment questions); the freight agent and the police chief. Make every interested branch of the service your ally. Give the members some real responsibilities—make them producers—and you will increase their loyalty and value to the conference. Give them little to do, and you will not hold their interest. But at the same time the advice of the executive secretary of the American Management Corporation is worth listening to. In mentioning some of the rules for successful association work he says, "Don't take on so many activities that nothing can be done well. Only undertake those things which can be carried out successfully." And in determining what should be done, it is important to know how much each project is worth in proportion to the total that can be accomplished so the greatest good can be done with the means at hand.

Statistics Essential to Prevention

Except for the few instances where the claim experience with a particular commodity, shipper, warehouse, location or consignee can be summarized by an inspection bureau, claim statistics are not consolidated in one place in such form as to be useful in combating serious conditions. Much of the claim prevention effort is wasted because these matters are handled in dribbles instead of assembling everything we have against certain shippers, consignees, loading or packing methods, etc., and then going after an improvement effectively. The Division's formal claim summary serves its purpose; but the totals must be reduced to the facts with which we must deal to get results in the specific case. Once we get the figures showing that claims against a certain shipper's or consignee's shipments are 10 or 20 times the average—which is of rather frequent occurrence—it is easy enough to get the facts behind these figures.

Of our prevention resources, statistics are the least developed and yet the first step in prevention is to get the facts. This applies to the individual railroad as well as to our co-operative activities. It should be said, however, that substantial progress was made by the individual roads last year in increasing the value of their statistical systems. A number of large roads adopted the card index method of recording claim prevention statistics. They report good results. This system has been the backbone of the very successful prevention work of the American Railway Express

Company for many years, so it is not untried. It consists in making a fanfold card for each claim paid, which is classified and filed by commodity, shipper, consignee and location, so that all cards covering a single condition meet in one place to show that condition in its true proportion. Automatically this discloses the sources of greatest loss. It is not suggested that data covering any considerable percentage of the 2,500,000 claims presented annually be classified in this way.



Steel Bands Prevent Vertical Shift of Clay Sewer Pipe in Experimental Load

Some of our most troublesome and expensive problems, however, could be statistized in one place, at a cost that would be a mere bagatelle compared to its benefits.

One of the most valuable and essential records that can be kept by the prevention department is the claim cost per car in which shortage or damage occurs. This record shows the relative need for attention to the prac-



Front and Rear of Plywood Furniture Crate Designed to Reduce Damage. The Largest Yearly Shipping Container Contract on Record, Totalling \$700,000, Was Recently Made by Shower Brothers Company, Bloomington, Ind.

tices of particular shippers, consignees or warehouses. It is essential that all roads maintain this record on their chief claim-producing commodities, as well as the average claim-cost per car handled.

Motion Pictures Impress Employees

The Division's library has been in fairly constant use throughout the year. Without a doubt motion pictures help to make employees conscious of their part in claim prevention. It is thought that pictures showing how switching and train shocks increase with the square of the speed have influenced many employees to avoid rough handling of cars. The human element will largely determine just how far we can go with this and similar problems.

There is a fine opportunity for some enterprising railroad to complete the story of rough handling, in a motion picture, by showing proper and improper signaling, handling of slack in trains, and other features not here-



Steel Strapping Employed in Illinois Central Cooper Shop at Chicago

tofore filmed. Questionnaires sent to 20 or more railway superintendents indicate unanimous approval of the use of such pictures. If no one road will do the job, we estimate a first-class picture in two reels could be produced by a group of 20 roads for approximately \$300 each, including one copy for each road. Local color and titles could be added for another \$200. Of course the scenario would have to be prepared by a qualified committee.

Loading Methods Need Improvement

Much remains to be learned about the effect of the upward thrust of the car floor in switching operations on lading and how this can be controlled. Experiments by one of the railroads in the loading of glass bottles, by another in fruit loading and by other lines in the use of high-tension steel bands to prevent sewer pipe breakage caused by the rise of the lading suggest interesting possibilities in the loading of other freight. The advantages of applying the buffing or bracing at three points in the car, i.e., at both ends and the center where the space permits, in preference to the center only, was demonstrated by the Western Weighing and Inspection Bureau in its analysis of damage in 12,000 cars of eggs

received at Chicago. The damage was about 50 per cent less when the buffing was used in three places.

There is still great need for loading instructions for many commodities not now covered. In general, each shipper is working out his problems independently; some are repeating the same expensive mistakes; each draws his conclusions from his own experience, which may be narrow; and improvements by one shipper are not quickly discovered and made available to all in the same industry. The commodity committees of the shippers regional advisory boards and trade associations can render more assistance in preparing uniform regulations for many commodities. It would appear that investigations of identical conditions are made by many roads where one investigation might answer for all.

Car Department Co-operation Essential

Probably adequate safeguards are not yet in force at many points against the reloading, with high grade freight, of cars which have just discharged goods damaged by water. Close co-operation is always needed here between the freight agent and the car department. If, as a practical matter, all such cars could be repaired immediately, or carded home for repairs, claims would be avoided accordingly.

There is more than a suspicion that all is not rough handling that goes by that name. If the draft gears on cars containing damaged freight are inspected it is believed that a good percentage will be found to be worn-out, or badly in need of adjustment. A "dead" draft gear, or one of an obsolete type that goes solid under a slight impact does not furnish much protection to the freight in cars handled in modern 100-car trains, nor in ordinary switching. A thorough investigation of this question might furnish information which could be correlated with the laboratory testing of draft gears now being conducted by the American Railway Association at Purdue University.

The observation of cooper shops on a number of roads showed the methods and appliances used vary from old, obsolete tools, with practically no mechanical aid, to the most modern and complete equipment which enables the men to do their work with the utmost efficiency. Some stations were even equipped with electric soldering irons, nail-pullers, electric glue pots, electric water heaters, for winter taping, and automatic gummed tape holders.

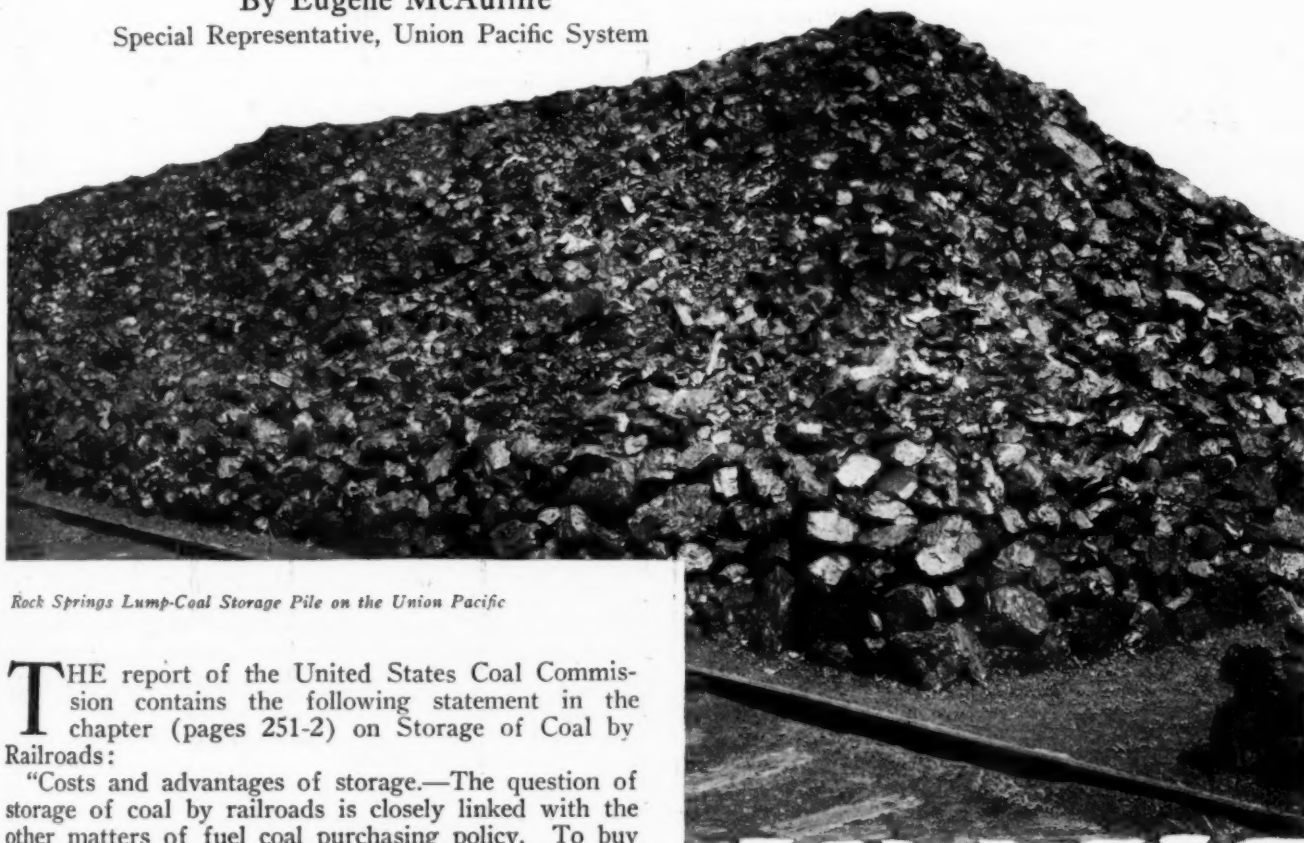
Another phase of the investigation was to test the feasibility of using data available at the cooper shop in claim prevention. Many shippers, without realizing it, are making a succession of similar errors in packing their products or in nailing, taping or assembling their containers. Speaking generally, the men that re-cooper freight know the classes of goods that are coming to them repeatedly for re-coopering, and they have the shippers pretty well in mind. Many instances could be cited where, by merely calling shipper's attention to slight defects in their work, a great deal of re-coopering could be saved. We cannot afford to ignore these trifles, because the cumulative effect of them is enormous. It is thought that a system of utilizing this information can be worked out locally between the freight agents associations, the prevention departments and the inspection bureaus. Efficiency in the cooper shop is a sizeable factor in keeping loss and damage down. It will also promote savings in the cost of doing the work, the total cost of which must run to several millions per annum.

The Storage of Railway Coal

The Union Pacific has successfully stored Rock Springs lump, without loss of fuel value after four years in the pile

By Eugene McAuliffe

Special Representative, Union Pacific System



Rock Springs Lump-Coal Storage Pile on the Union Pacific

THE report of the United States Coal Commission contains the following statement in the chapter (pages 251-2) on Storage of Coal by Railroads:

"Costs and advantages of storage.—The question of storage of coal by railroads is closely linked with the other matters of fuel coal purchasing policy. To buy and store coal in the summer months represents a cost that the railroads would prefer to avoid. They have depended in the past on getting their supplies currently. This is particularly true of those that have large producing fields on their lines.

"Off-season purchase and storage.—Offsetting the cost of storage are the facts of better prices in the summer storage season than in the winter period of maximum requirements; the more positive assurance of supply, the elimination of excuse for confiscation, and the release of cars for revenue business. The assigned car for railroad fuel has operated to relieve the carriers from their proper responsibility in regularizing the production and distribution of bituminous coal. As the largest users of coal, the railroads and public utilities have the largest moral responsibility in every measure of stabilizing the industry.

"Unnecessary use of cars for holding storage coal in times of strong demand is a practice that may reduce costs for the railroads, but it raises the cost to all other customers. Storage on wheels subtracts from the people's car supply."

The assigned car has been eliminated by the dictum of the United States Supreme Court. Whenever and wherever it has been found advisable to store coal, generally in anticipation of coal-mine labor trouble, storage has been put down. The maximum tonnage of soft coal in storage, including stocks in the hands of commercial consumers and in the yards of retail dealers, but excluding coal in the cellars of householders and coal carried for steamship fuel and coal on the

upper lake docks, occurred on April 1, 1927, when 75,000,000 tons were reported on hand in storage piles by the U. S. Bureau of Mines. Between, April 1, 1927 and April 1, 1928, the stocks of bituminous coal in storage were reduced to 48,300,000 tons.

Coal Stored Heavily in Winter of 1923-4

It may be of interest to refer to the recent experiences of the Union Pacific System in the matter of putting down and carrying storage coal. During the winter of 1923-24 the system stored rather heavily, anticipating a possible mine suspension. This coal was taken up gradually during the period from April, 1924, to March 1, 1926, when a balance of 58,000 tons put down in 1923 and 12,500 tons put down in 1924, remained in storage piles.

Desirous of keeping 100,000 or more tons on hand to protect against an abnormally severe winter, such as is occasionally experienced in the western plains region, the question of taking up the remaining storage coal, some of which had been on the ground for nearly three years, was discussed, fresh coal with a double handling charge to be thereafter put down in its place. The coal in question was mined in the Rock Springs (Wyoming) field and consisted of that portion of the run of mine that passed over a four—a five—or a six-inch screen, the residue of the mine run being used for current locomotive consumption. To determine the real condition of the coal in storage, several of the

piles, including those standing at Cheyenne, Wyo., Denver, Colo., and Council Bluffs, Ia., were examined. It was found in each instance that the surface of the piles was broken down into a dry granular slack, effectually sealing both water and air from the interior mass, the coal below ten inches retaining its original lustrous color, the lumps intact and presenting no increased tendency toward fracture. This coal, when freshly mined, was neither hard and flinty nor unduly soft, occupying rather a medium structural character. In no instance has any semblance of firing developed.

The coal from the Rock Springs field, as shown by analyses of seventy-two face samples, is rather high in moisture, a characteristic looked upon as prejudicial to storage. The average analysis shown by seventy-two tests of mine face samples is shown in one of the tables.

Average Analysis of Seventy-two Mine-face Samples

	Per cent
Moisture	14.04
Volatile combustible	35.15
Fixed carbon	43.13
Ash	7.68
Total	100.00
B.t.u. per lb.	10,320

While the sulphur content was not taken in making the seventy-two tests, the coal as mined runs in sulphur from .30 to 1.27 per cent.

In May, 1927, samples from the surface of the piles located at Cheyenne and Council Bluffs, as well as from the unweathered coal lower down in the two piles, were taken and submitted to the railroad's chemist for analysis, with the results shown in the table.

Analysis of Samples of Coal in Storage from Four to Five Years

Analysis, Per cent	From top of pile		From below surface	
	Council Bluffs	Cheyenne	Council Bluffs	Cheyenne
Moisture	4.38	4.52	15.53	14.24
Volatile combustible	37.14	39.12	34.79	44.87
Fixed carbon	52.60	52.04	47.19	35.89
Ash	5.88	4.32	2.49	5.00
Total	100.00	100.00	100.00	100.00
Sulphur68	.85	.66	1.23
B.t.u. per lb.	11,170	11,632	10,793	10,471

It will be observed that the combined surface samples show a moisture content of 4.45 per cent, while the unweathered coal below the surface averaged 14.88 per cent, a figure not far removed from the average shown for the 72 mine-face samples first quoted. The thermal value of the surface coal averaged 11,401 B.t.u. per pound, that of the unweathered coal 10,632 B.t.u. per pound, the center of the pile running 312 B.t.u., or 3 per cent, above the 72 mine-face samples.

The apparent absence of loss of fuel value suffered by four years' storage, as shown by the laboratory test, was well borne out when the coal was placed on locomotives employed in handling heavy fast perishable fruit trains in the fall of 1927, nearly four years after the major portion of this coal was placed in storage. Not a single train delay was traced to the use of the storage coal. The coal was taken up only to meet a fuel demand, and a remnant of the 1923 storage is still in stock at this writing, now nearly five years since placing it in storage.

The Union Pacific System rules governing the storage of coal are set forth below, and the successful storage of a high-moisture coal for an indefinite period is due to (a) the selection of lump coal passed over not less than a four-inch screen, and (b) the strict

observance of the following rules, *the rule requiring the lowering of the clam shell to a point just above where the bucketful is to be deposited, being rigidly enforced.*

Coal should not be stored on soft, wet, or boggy ground. Water should not be permitted to accumulate under the pile, and the site selected, if possible, should be shielded from high winds. The storage location should be thoroughly cleaned of all refuse matter giving particular attention to the removal of vegetation, wood, discarded waste, old clothes, or other similar combustible matter. It should also be free of metallic objects. Coal should not be stored over a steam pipe, a sewer trap or against a hot wall. All columns or beams, or any objects which will form air pockets should be avoided.

In handling coal with locomotive cranes and clam shell buckets, two parallel tracks located at 16-ft. to 20-ft. centers should be provided. The loaded cars to be placed on one track and unloaded by the crane operating on the parallel track, the coal being placed on a pile alongside the crane. The width of the pile depending on the length of the boom of the crane. The maximum height of the pile is determined by the width of the base and the flow line of the coal. For lump or mine run coal the height of the pile should not exceed 18 ft.; slack or stoker coal height should not exceed 10 ft. The height of the pile should be decreased in the case of coal that is known to fire readily. The track should remain in position for the quick removal of coal that may become overheated, and for the subsequent reloading of the stored coal.

Coal should be stored in individual piles about 200 ft. in length, leaving about 10 ft. space between each pile. Coal should be walled up on the side of the pile next to the track and between piles, the walls being about two foot high.

If practical, coal coming from the same field and of the same general nature and quality should be stored separate from coal coming from other fields.

In unloading coal from cars, the clam shells should be lowered to a point just above the surface of the pile before the contents are dropped. A layer of coal two feet in height should be laid down the full width of the base of the pile and over the entire length of same. The second and succeeding layers, each two feet in thickness, should be laid in like manner.

Fresh coal should not be unloaded on coal which has been left from a previous storage.

All foreign matter in coal as received should be removed and not allowed to enter the storage piles.

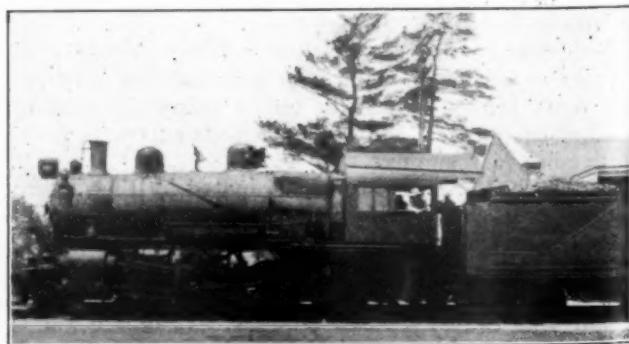
All coal storage piles should be examined once a day for indications of fire, the examination being made early in the morning, as experience has shown that this is the most favorable time to detect fires.

The United States Coal Commission in its report (page 1836) covered the practicability of successful storage of bituminous coal in the following words:

"The conclusions of those who have studied the technical question of soft-coal storage are that there is a proper safe way for the storage of any and all kinds of soft coal, and that improper methods will render the best coal liable to spontaneous combustion. For most coals the losses in heating value and degradation are comparatively small."

The experience of the Union Pacific System has borne out the Commission's statement.

* * *



Local Freight at Culver, Ind., on the Pennsylvania

Air Transportation and the Steam Railways

Demand exists for air passenger travel—Co-operation between old and new carriers advised

By William P. MacCracken, Jr.

Assistant Secretary of Commerce for Aeronautics

THE recent rapid strides in commercial aviation have brought one important question before the railroads of the United States:

"What will the airplane do to the railroad?"

As usual there are extremists in regard to this subject. A few contend that the airplane will eventually supersede all other forms of transportation except for the carrying of slow-moving freight. At the other end are the diehards who still believe, in spite of the ever accumulating evidence, that the airplane has not progressed beyond the experimental stage and will never amount to anything.

No one who is familiar with the true situation expects that the airplane will supersede any of the existing methods of transportation. It is more logical to believe that the airplane will find its proper place as a fifth carrier in our national system of transportation. The backbone of this system is, and will continue to be, the railroad. Water-borne traffic plays an important part and will do more when we have the deep waterways from the central western states to the Gulf of Mexico, but the largest amount of water-borne traffic has been and probably always will be the slowest-moving freight. Passenger and freight motor coaches and trucks have forced themselves into the economic scheme and are now recognized as necessities. The sphere of motor trucks and of individual passenger cars has been fairly well established, and that of the electric transit line is familiar to everyone.

The airplane will necessitate a new order of traffic distribution between these five carriers, affecting some more than others. It is already taking over the carrying of small or light articles of high value, or for which there is an imperative need regardless of value. Its fast passenger service will inevitably win over a certain percentage of big business men who live by the adage, "Time is money." As a carrier of mail its complete success cannot be denied. The record of the transcontinental route alone substantiates this. As the routes expand to cover almost every part of the country, each phase of air commerce will grow in proportion.

In the period during which the Department of Commerce has been charged with promotion and regulation of civil aeronautics, the air transport lines have increased from 2,811 miles to 11,336 miles. There are now 100 manufacturers of aircraft and it may be that as many as 5,000 airplanes will be produced in 1928. Twelve-passenger cabin planes are being constructed to inaugurate scheduled transportation over some of the routes. Scores of cities are constructing airports or improving their existing facilities to accommodate this increase in air commerce.

The government is taking every possible step to safeguard the flying public. The Department of Commerce, through its system of regulation and licensing of air-

craft and airmen, is helping the industry reach a higher standard of performance. Through its Airways Division, it is lighting many of the civil airways and is establishing navigational aids on all of them. Through the Bureau of Standards, it is perfecting the radio directive beacon which will guide pilots through fog and other conditions of bad visibility. These are only a few of the ways in which the government is promoting this new method of transportation.

The airplane has already become a factor in the transportation scheme. It is quite logical, therefore, that the railroads should be the agencies to aid in its further development, particularly in regard to passenger service. The railroads have had the benefit of experience and training in such work. They already possess efficient organizations capable of taking over the routine details. They are financially sound and are thus able to withstand any period of initial sluggishness or later temporary depression.

They possess high reputations for good quality of service. Their advertising agents, traffic experts, ticket agents, accountants, etc., could easily be instructed to add the details of this new service to those which they already handle. The result would be a concentrated system of publicity and the creation of general air-mindedness throughout the railroads of the country. The traveling public, thus brought into close contact with "air talk," would be much more easily converted to using this method of transportation when speed is an important factor in their travel.

Combination Air-Rail Service

The practical uses of the airplane in conjunction with the railroad are several:

They can serve in establishing "feeder" routes radiating from central terminals to outlying sections where the cost and maintenance of an expensive right-of-way is prohibitive.

The airplane will be especially useful in making short cuts over mountains or impassable country around which the railroad must detour.

The airplane can be used in carrying out scenic tours from stopping points on the railroads, including the national reservations such as Glacier National Park, Yellowstone, Yosemite, and other scenic spots such as the Grand Canyon, Niagara Falls, etc.

There can be a combination railroad and airplane service by means of which a traveler can fly by day between certain points, boarding a train at evening for a night's sleep in a Pullman. This service is already announced by several large railroads and detailed plans are now being prepared. In case of the long transcontinental journey from New York to San Francisco, the passenger will leave his train in the morning and begin his flight from a designated airport. At night he will again board a train, leaving it on the following

morning for a second flight which will place him at his destination.

Finally, the airplane can prove of great help in emergencies, as for instance when snow slides, wrecks, bridge washouts, and rock slides have seriously impeded operations.

Methods of Air-Rail Co-ordination

There are two plans which can be used in developing air transportation service in connection with the railroad:

1. The railroad can own and operate aircraft in the same way as they own and operate their cars.

2. They can make an agreement with existing air transport operators by which the latter will render all service required and receive their appropriate percentage of the fare collected. The railroad will be entitled to collect a commission of service, for selling the ticket, making the reservation, attending to transfer of baggage and passenger to the airport, and for carrying out the administrative work through its regular organization.

The first plan may seem most unlikely at this time, although it is possible that it may be adopted later. The second system seems most logical, as the existing air transport companies have already worked out many of the problems connected with actual flight and are now capable of efficient co-operation with the railroads. The railroads can stand aloof and let the air transport companies develop their own air passenger service, but this will result in active competition instead of a working arrangement. Experience both here and abroad has clearly demonstrated that there is a demand for air passenger travel. It is only a question of whether it will be developed in co-operation with the railroads or wholly independent of them, or by the railroads themselves independent of the air transport operators. The preferable way would be to work it out on the co-operative basis, at least in the initial stages.

Blacksmith Problems Discussed

THE 32nd annual convention of the International Railroad Master Blacksmith's Association was held at the Hotel Sherman, Chicago, on August 21-23, inclusive. At the opening session an interesting and encouraging letter from L. A. Downs, president of the Illinois Central, was read. C. W. Cross, supervisor of apprentices of the New York Central, then presented a paper outlining the objectives and salient features of apprentice training as developed on the New York Central. E. L. Woodward, western mechanical editor of the *Railway Age*, discussed the subject "The Blacksmith Foremen's Broader Viewpoint," calling attention to the decrease in blacksmith shop forces in recent years as a result of the increasing use of steel castings and autogenous cutting and welding, and maintaining that the best way for blacksmith foremen to retain their old-time prestige and influence is by familiarizing themselves with new developments, including especially the proper forging and treating of alloy steels.

Mr. Downs' letter read in part as follows: "Blacksmith foremen on the railroads occupy positions of great responsibility, and they are called upon to measure up to high standards of capability. They need to be experts on metals and their selection and processing for various kinds of work. Proficiency in co-ordinating shop operations and ingenuity in devising methods of performing unusual tasks are also essential qualities. Much depends, too, upon their interest and initiative in

searching out and putting into practice ways and means to effect economies and improvements in the handling of their work.

"Along with their technical attainments they must also be specialists in the humanics of their job. By humanics I mean the study of human nature to the end that they may be able to enlist the co-operation of their men and bring forth their best efforts. The ability of a foreman to stimulate team work and friendly competition among his men is a factor second in importance to none in producing the combination of quantity and quality of output which is the best proof of his efficiency.

"Railway blacksmith foremen now have more and better tools and materials to work with than ever before, and they are expected to produce correspondingly better results. Their abundant success in fulfilling this expectation is a glowing testimonial to their skill and dependability and a reliable indication of their future achievements. I believe I speak for the managements of all the railroads in congratulating the members of your organization upon their splendid work and assuring them it is heartily appreciated.

Train Accidents in March

W. P. BORLAND, director of the Bureau of Safety has made reports to the Interstate Commerce Commission on nine train accidents which occurred in the month of March, 1928; six collisions and three derailments. Abstracts of these reports follow:

Colorado & Southern. Peabody, Colo., March 6.—Derailment of locomotive No. 7, eastbound, running without train. This derailment occurred on a narrow gage line on a curve of 24 deg., with grade descending at 2.8 per cent. The engineman was killed and all that the report can say is that he lost control of his engine. The fireman, badly injured, could give no useful information. The engineman had applied and released the brakes several times while moving down the steep grade and there was no evidence but what the brakes were in good order. The engineman had made one trip over this line in the forenoon of the same day, hauling a passenger train of three cars; but except for this trip, he had not run on this section of the road since June, 1922; his work, however, had been on other divisions having steep grades and sharp curves.

Detroit, Jackson & Chicago, Austin, Mich., March 11.—Eastbound passenger train No. 158, consisting of a single electric motor, ran past the station where, by dispatcher's order, it should have met a westbound passenger train, consisting of a single motor car, and collided with the westbound while moving at 15 to 25 miles an hour, crushing the front ends of both cars. One passenger was killed and 24 passengers and one employee were injured. The motorman and the conductor of No. 158 were held responsible. The order had been received by them only four minutes before the time that the collision occurred. Both of these men had on former occasions been suspended for running past meeting points.

New York, Chicago & St. Louis, Tipton, Ind., March 12, 2.50 a.m.—Eastbound freight train No. 62, third section, moving at high speed, collided with the preceding train, second No. 62, and the locomotive was overturned. The conductor and one brakeman of the leading train were killed. This train was not protected by flag and the approaching engineman is also held responsible for approaching yard limits not under proper control.

Florida East Coast, Titusville, Fla., March 16, 3:57 a.m.—Southbound passenger train No. 37, moving at high speed, was derailed on a curve of 5 deg., 53 min., making a bad wreck. The engineman and fireman were killed and 16 persons were injured. The inspector concludes that the derailment was caused by excessive speed, though the men on the train estimated the rate at not over 40 or 50 miles an hour. There had been no appreciable reduction in speed up to the moment that the train left the rails. There was evidence that the engineman had been alive and awake and in full possession of his faculties.

Pennsylvania, Marsh Run, Pa., March 16, 8:12 a.m.—Collision between westbound freight trains on a four-track line, fouling all main tracks. Westbound freight train No. TH-1 running on Track 4, under a permissive manual block signal, collided, while running from 25 to 50 miles an hour, with a preceding freight, No. P-9, wrecking the caboose and four rear cars of the leading train, which had just been brought to a stop. A part of the wreck fell on the eastbound freight track and did serious damage to a freight train moving on that track, traveling at about 30 miles an hour. On the next track, there was no train, but on the one farthest to the left, Track No. 1, eastbound passenger train No. 992 was approaching, and it ran into the wreck of the freight cars at 40 miles an hour or faster. The passenger locomotive was overturned and the wreck caught fire, resulting in some damage. The fireman of freight train TH-1 was killed, and 17 passengers and four employees were injured. Responsibility rests on the engineman of No. TH-1, but he was so badly injured that the inspector could not interview him. There was testimony to the effect that this engineman had exonerated the flagman of the standing train.

The report says that this collision would have been prevented by an adequate automatic train stop.

Chicago, Burlington & Quincy, St. Paul, Minn., March 23.—A transfer freight train on the "Koppers lead track," connecting the Burlington with the Great Northern, which had been stopped to obtain orders by telephone, was run into at the rear by a following transfer freight, and the conductor of the standing train was killed. One other employee was injured. The blame is placed on the fireman of the colliding train who neglected to maintain a proper look-out and to notify the engineman that the track was not clear. This fireman was sitting on his box, looking straight ahead, and could have seen the other train 500 ft. away; and it is held that the engineman was justified in depending upon him to keep the proper look-out, the train being on a curve to the left. The fireman could give no reason for his neglect. The company is criticized for not having definite rules for the operation of trains on this freight track; and also it is shown that the testing of air brakes had been neglected.

Union Pacific, Loring, Kan., March 28, 3:55 a.m.—This section of the road is owned jointly by the Union Pacific and the Chicago, Rock Island & Pacific and the collision here described was between two eastbound freight trains of the Rock Island. Extra 2663—with 84 cars—having been stopped because of a hot journal, was run into at the rear by extra 2696—62 cars—moving at between four and seven miles an hour. The caboose and the last car of the standing train were wrecked and afterwards consumed by fire. In this caboose were seven drivers, of whom three were killed and the other four injured. Responsibility is placed on the engineman, fireman and a brakeman of 2696. The testimony of these men was inconsistent and confusing, and the inspector concludes that none of the men were

keeping proper lookout, the view of distant and home automatic signals having been good and there being no evidence that the signals were not operating properly. The distant signal must have been displaying a caution indication, but no attempt was made to control the speed until the train was close to the home signal. This signal was 1,380 ft. back of the point of collision. The flagman of the standing train had been back and had put down torpedoes but he had been called in; and the inspector thinks that in view of the conductor's knowledge that another train was closely following, he should have allowed the flagman to go farther back.

St. Louis-San Francisco, Nash, Mo., March 29.—Southbound freight train, extra 4012, carrying a tractor derrick on a platform car, ran against and injured the end batter post of a bridge and was derailed. The derrick had shifted its position. Presumably because of this weakening of the bridge, a northbound freight, extra 4023, about two hours later, broke through the bridge, and the engineman and front brakeman were killed. Two other persons were injured. All concerned testified that precautions believed adequate had been taken; and no exact description of the bridge failure is given. The only definite point in the statement concerning the bridge is that two lateral tie-rods, 1 in. square, in the top chord, were found broken. The tractor was loaded at St. Paul. At St. Louis the blocking had become loose and was again put in order but the revolving part of the derrick was later found protruding from the side of the car. The conductor of the train thought, however, that he had taken action to prevent further shifting, and he moved the train over the bridge at three miles an hour or slower. The grade approaching the bridge is ascending, and leaving the bridge is descending, and the releasing of the independent engine brake caused the slack to run out, which apparently resulted in further shifting of the derrick. The general foreman of bridges and buildings made, after the first derailment, what he considered a very critical examination of the bridge. The inspector finds ample evidence that the bridge was in good condition prior to the time of the first derailment.

Pennsylvania, Dugrun, Ohio, March 30, 5:14 p.m.—Eastbound passenger train No. 28, The Broadway Limited, stopped because of the presence of a work-train on the track ahead of it, was run into at the rear by eastbound passenger train No. 58, The Liberty Limited; 59 passengers, two mail clerks, 13 railroad employees and four Pullman employees injured. Because of a severe sleet storm, accompanied by high wind, which had blown down about forty miles of telegraph poles, within a distance of 81 miles, several work-trains were in service, and all trains had been notified to look out for obstructions on the track; an order had been issued giving notice that automatic signals were unreliable. The order directed enginemen to make the best progress consistent with safety. Notwithstanding the storm, it appears that these two fast trains were very nearly on time. The inspector finds that the engineman of No. 58 did not maintain a proper lookout, and that the flagman of No. 28 contributed to the collision by his failure to use torpedoes. This flagman had gone back about 2,000 ft. but his flag was not heeded, although the line was straight and it is held that the engineman ought to have seen the flag. He did not apply the brakes until some time after he had passed the flagman. The fireman, on seeing the flag, called to the engineman twice, and it is the conclusion that the latter's mind must have been otherwise occupied to the extent of preventing him from keeping a proper watch of the track ahead.

Looking Backward

Fifty Years Ago

Passenger rates on the Denver & Rio Grande, the narrow gage road which was built through the mountainous section of Colorado, are 8.5 to 9.2 cents per mile with some local rates as high as 10 cents per mile.—*Railway Age*, August 22, 1878.

The Union Pacific has in successful operation a machine which cleans and renovates discarded waste at an expense of 8 cents per pound, making it usable for wiping and cleaning engines.—*Chicago Railway Review*, August 24, 1878.

Receipts of grain at the seven Atlantic seaports show that from January 1 to August 3, 1878, the railroads carried 92 per cent more of that traffic than in the same period in 1877.—*Railroad Gazette*, August 23, 1878.

The Buffalo, Corry & Pittsburgh, running between Brocton, N. Y., and Corry, Pa., [now part of the Pennsylvania] was sold on August 17 for \$75,000. This price included 43 miles of line, two locomotives, seven passenger cars and 36 freight cars. The original cost of the road was over \$1,250,000.—*Chicago Railway Review*, August 24, 1878.

Twenty-Five Years Ago

Frank G. Pettibone, assistant to the general manager of the Gulf, Colorado & Santa Fe, has been appointed general superintendent, with headquarters at Galveston, Tex.—*Railway and Engineering Review*, August 22, 1903.

One of the largest single railroad contracts that has been offered in recent years has been let by the San Pedro, Los Angeles & Salt Lake [now the Los Angeles & Salt Lake] for the grading of 85 miles of roadway southwest from Calientes, Nev., at a cost of nearly \$2,000,000.—*Railway and Engineering Review*, August 22, 1903.

The Indianapolis Southern [now part of the Illinois Central] has authorized the construction of a railroad between Indianapolis, Ind., and Sullivan, via Bloomington, about 110 miles. Connection will probably be made with the Illinois Central at Switz City.—*Railroad Gazette*, August 28, 1903.

A train on the Gulf & Interstate [now part of the Gulf, Colorado & Santa Fe], which was stopped en route from Port Bolivar, Tex., on September 8, 1900, by the Galveston flood which washed away the track for several miles on each side of it, completed its run by arriving at Beaumont, Tex., on August 20, 1903, 1,062 days late.—*Railway Age*, August 28, 1903.

Ten Years Ago

The Class I railroads spent, up to June 30 this year, only \$244,401,000 for additions and betterments, an amount representing only about one-quarter of the total expenditures specifically authorized by the Railroad Commission.—*Railway Age*, August 23, 1918.

W. W. K. Sparrow, valuation engineer and member of the valuation committee of the Chicago, Burlington & Quincy, has been appointed chief engineer in charge of corporate interests of the Chicago, Milwaukee & St. Paul. Henry E. Pierpont, freight traffic manager of the Chicago, Milwaukee & St. Paul, has been appointed traffic manager.—*Railway Age*, August 23, 1918.

The Western Passenger Association, the Trans-continental Passenger Association, and the Southwestern Passenger Association, with their auxiliary bureaus, have been abolished and their activities are to be assumed by the Western Passenger Traffic Committee. This committee will be made up of a passenger bureau, with tariff, clergy permit and military divisions, and a bureau of service of national parks and monuments.—*Railway Age*, August 23, 1918.

On July 22 a unit of three continuous spans of the Bessemer & Lake Erie bridge over the Allegheny river, near Blacks Run, Pa., was moved laterally 16 ft. 3 in. Nine days later a second unit of 983 ft. was moved a like distance. The first unit was 1,140 ft. long and weighed 6,500 tons, and constituted the heaviest and longest bridge structure ever moved in this manner.—*Railway Age*, August 23, 1918.

Books & Letters

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

A Bibliography of Alaskan Literature 1724-1924, by James Wickersham. The "farthest North college," the Alaska Agricultural College and School of Mines, Fairbanks, Alaska, makes a truly impressive contribution with this, its Miscellaneous Publications, Vol. I, containing 10,380 items in several languages covering all phases of Alaskan history. An "Outline history of Alaskan literature" p. 1-37, is helpful, while land transportation articles are to be found under these subjects: "Dogs," "Klondike," "Railroads" (for which see also the lists of House and Senate reports and hearings listed in a separate section), and "Reindeer." 635 p. Pub. by the College, Fairbanks, Alaska.

Commerce Yearbook 1928 (Sixth Number) Vol. I—United States, compiled by U. S. Bureau of Foreign and Domestic Commerce. "Transportation and Communication" p. 584-637. "Commencing with this issue the Commerce Yearbook will be designated by the year in which it is published consequently there was no issue bearing date 1927." (t.p.) 708 p. Pub. by U. S. Govt. Print. Off., Washington, D. C., \$1.25.

Report of Sub-Committee on Action of the State Railroad Commissions in Allowing Railroads to Coordinate Rail and Highway Service. "Requirements for secular of certificates of public necessity and convenience" p. 12-19. Decisions indicating commission policy, p. 20-125. Pub. by Motor Transport Division, American Railway Association, New York City. Apply.

A Communication

Illuminate the Station Names

ST. LOUIS, Mo.

TO THE EDITOR:

I have often heard the question asked by passengers after dark "I wonder what town or city this is." Train employees have answered this question many times and often not too pleasantly.

Passengers debarking at railroad stations at night feel uneasiness until they can get near enough to the sign to read the name of the town. Pullman employees who have passengers to put off trains at intermediate stations after dark must depend upon their experience and judgment in putting passengers off trains, as stations and towns look alike in the dark and trying to read the station sign is entirely out of the question. Many employees do not take such chances, as it is a serious matter to put persons off at the wrong station, and to make sure, they ask the passenger to accompany them to the coaches a few minutes before the train is due at their station, in order to keep in touch with the train conductor. In this manner, doubt is removed as to the station. The inability to read the name on the station has caused anxiety and mental strain, not only to railroad employees, but to the town's own citizens, its business men, its visitors and any others who may have to pass through.

As there must be some light inside the station, would it not be well worth the time and little expense to place a drop light near the center of the station sign or at each end of it, on both sides of the station, so that the name can be read after dark? The benefits would outweigh the small cost of illumination.

It may be that some of the city and town officials and business men would consider taking the matter up with the railroads that serve them and adopt an illuminated station sign that would be in line with civic improvement and pride.

J. A. K.

Odds and Ends of Railroading

John Anklet, a farmer of Swain, N. J., which is near Cape May Court House, saved a Pennsylvania passenger train from possible derailment on Monday, August 13, by waving an American flag. The train was carrying about 300 passengers from Wildwood, N. J., to Philadelphia, Pa. Mr. Anklet had the energetic assistance of his son who also signaled the engineman with a burlap bag. According to newspaper reports, the passengers on the train took up a collection which amounted to \$125.25, as a reward for both father and son. In all probability the collection would have amounted to a larger sum if the train had been going in the opposite direction for no doubt most of the passengers were broke, or at least badly bent after spending the week-end at Wildwood. The railroad company arranged to have one of its trains stop at Swain to present the award to Mr. Anklet and his son. Anyhow, this all goes to prove that the days of railroad romance and exciting movie scenarios are not over by any means.

A Chapel-Car

A most unusual car left Chicago for Colorado on August 13. The car was converted into a chapel for the celebration of mass especially for a party of 125 tourists, headed by Rt. Rev. Msgr. John J. Murray of Baltimore. The windows in the chapel-car are of stained glass and it is fitted with an altar, complete in every detail. The color scheme is white and gold with red carpeting.

Civic Pride

"The writer desires to call attention to an injustice dealt to the village of Rockwood regarding the birthplace of a certain hippopotamus born on the circus train on July 19," says T. L. Brisch of Rockwood, Wis.

"As reported, the circus train was delayed near Francis Creek because of the above mentioned occurrence. This is entirely unjust in view of the fact that the train stopped at the Rockwell Lime Company quarries in Rockwood for some time to facilitate the birth of the future spectacle. As this hippopotamus was the only one ever born in captivity the honor must consequently go to Rockwood and not to Francis Creek."

The Tale of Oswald

Oswald, so far as is known, is the world's only railroading pigeon. Picked up wounded, last October, by the motorman and conductor of work car 252, on the electric lines of the Canadian National, Oswald has since adopted the car and its crew. Now he never leaves the car and takes a 150-mile ride on it daily, from Lambton, Ont., to Guelph and return. The work crews who ride on the car are treated with scorn by Oswald. He will have nothing to do with anyone other than the motorman and conductor of the car, and frequently rides for long distances, perched on the former's shoulder.

Communication on a Large Scale

The largest private telephone and telegraph plant in the world is owned and operated by the Pennsylvania. More than 140,000 miles of copper wire makes it possible for the railroad to get in instantaneous communication with any part of its system. More than 116,000,000 local and long distance telephone calls are handled each year. In addition, about 32,000,000 telegraphic messages are handled. These figures do not include the use of the telephone and telegraph in such work as train dispatching. To handle the telephone traffic alone over a 24-hr. period requires the service of 478 operators.

Limited Stops Only

Train No. 77 of the Chicago & North Western stops regularly at Maywood, Ill., Melrose Park, Bellwood, Proviso and Elmhurst. Recently it skipped the trio of stations in the

middle. It was a matter of necessity—two youths with pistols were in the cab with the engineer and they persuaded him that he had better get to Elmhurst as quickly as possible. The pair boarded the train at Maywood. They waved aside the conductor and proceeded to the cab. "Step on it, brother," said one. "Never mind the stations." In something less than the scheduled eleven minutes, No. 77 got to Elmhurst. A policeman was on the platform. Members of the train crew shouted. One of the young gunmen got away. The other was arrested. The police are still trying to learn his motives in terrorizing the engineer.

News Notes from Everywhere

Austin, Texas.—The Railroad Commission of Texas has denied an application for free railway transportation for polo ponies returning from tournaments.

Edinburgh, Scotland.—Cheaper railway fares on Sundays than on week days are attacked by the Free Church assembly, on the ground that they are an incentive to Sabbath-breaking.

Spokane, Wash.—Angelo de Martino, section foreman, has given up track manicuring for art. He now has several pictures hung in the gallery of the Allied Artists' Association.

Managua, Nicaragua.—Bandits have lately taken to a new and alarming sport. Several railway accidents have been caused in the past three months by placing spikes on the rail.

Obregon, Guanajuato, Mexico.—The Mexico City-Laredo train was saved from wreck and robbery at this place by engine trouble. Because of the engine trouble, the train was an hour late, and, instead of being wrecked by a band of 150 rebels, a freight train preceding it met that fate.

A "Teakettle" Makes Good

A sentimental interest attaches to those ancient "teakettle" engines, late of Illinois Central suburban traffic. Nearly two years have slipped past since they were relegated to the locomotive limbo.

Nowadays the wheezy little whippets are rarely seen along the lake front electrified highway. One or two sometimes are descried in the railroad yards, sturdy, self-reliant little urchins of the rails, panetella-size smokestacks, camel's-hump sand boxes and other accessories of the nifty 90's. They are overwhelmed in bulk by the great modern passenger engines, but something in the confident cut of their jibs seems to say:

"I hauled the World's Fair crowds in '93 when you were just a hunk of iron ore," or, "I introduced the mile-a-minute rate to suburban service; snort that off, you big track tortoise!"

For a long time we had supposed that the little percolators were being retained as roundhouse pets, but the other evening we saw one at the Randolph street station. It was panting in a businesslike manner. But alas, its squat boiler was rusty and dusty, its smokestack was patched in two places and it looked as if it were going to the dogs.

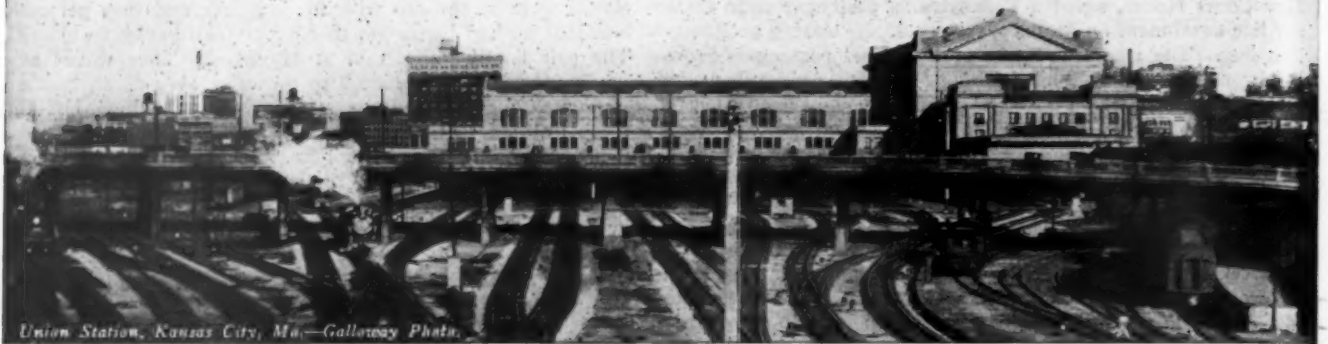
"This way to the dog train," yelled a brakie.

And so it was! The evening dog track special!

Musing on the decay of locomotives and institutions, we stepped into an electric express and soon were whizzing southward. Soon our eyes met a dazzling sight. Another "teakettle!" Not dusty, rusty and patched, but newly painted, scrubbed, polished. Its bell glistened like a fire gong. On its tender was painted in bold gilt letters: "Manchester & Oneida R. R."

Bon voyage, brave little engine. As you plod daily with your combination milk train and local, let your whistle wake the echoes with a blast that for years thrilled a metropolitan public. And, though citybred, don't shy when wild-looking cows get on the track!—Chicago Daily News.

NEWS of the WEEK



Union Station, Kansas City, Mo.—Gallows Photo.

THE PACIFIC RAILWAY CLUB will hold its next meeting at Hotel Oakland, Oakland, Cal., on September 20, with a paper by A. C. Holden of the General Railway Signal Company on automatic train dispatching.

IN THE SECOND QUARTER of the Pennsylvania's safety campaign among employees, gold banners for the lowest casualty record have been awarded to the Delaware division, Renovo division, Indianapolis division and the Juniata shops. Silver banners were awarded to the Elmira division, the Renovo division, the Toledo division and the Juniata shops. The number of injuries per million man-hours, for the entire system, was 10.7 during the second quarter, as against 11.9 for the first quarter.

AN ENGINEMAN, a brakeman and the entire crew of postal and baggage employees on a Chicago, Burlington & Quincy mail train were arrested on August 19 when the train was stopped at a small station near Galesburg, Ill.; this in connection with an investigation of postal robberies. Postal inspectors in charge of the investigation state that United States mails carried on the Burlington have been robbed of large amounts of currency and merchandise during the past year. The men, when arrested, were taken off the train and a relief crew was sent out from Galesburg to finish the run.

Minneapolis Traffic Problems

In connection with a municipal survey of railroad facilities in Minneapolis, Minn., the Great Northern has offered its passenger terminal for use as a union station to accommodate the passenger trains of the Chicago, Milwaukee, St. Paul & Pacific, the Chicago, Rock Island & Pacific and the Minneapolis, St. Paul & Sault Ste. Marie, which now use the Milwaukee station. In addition to the Great Northern trains, trains of the Northern Pacific, the Chicago & North Western, the Chicago, Burlington & Quincy, the Chicago Great Western and the Minneapolis & St. Louis now use the Great Northern station. The city of

Minneapolis has indicated that it would expect the Milwaukee to either enter into a passenger terminal merger or participate in a grade separation program which the railroad has estimated would require an expenditure of more than \$4,000,000 on its part.

Suicide Not an Accident

The number of persons killed in train service accidents on the railroads of the United States in 1927 was 6,096, as reported by the Interstate Commerce Commission and noted in the *Railway Age* of August 11, page 261; and this number is 171 less than the number given in a preliminary statement of killed and injured issued last April. The director of the Bureau of Statistics calls attention to the fact that this difference of 171 is due to the exclusion of suicides from the record. Suicides are reported by the railroads, and are recorded; but as a suicide is not an accident, the railroads request that such cases be excluded from the bulletin, as having no legitimate place in an accident record.

Western Metal Congress

Plans are being developed for the participation of twelve national technical societies in the Western Metal Congress, Western States Metal and Machinery Exposition, and the semi-annual meeting of the American Society for Steel Treating, which are scheduled to be held at Los Angeles, Cal., January 14 to 18, 1928. Five days will be devoted to technical sessions on the making, working and treating of metals, and the exposition will include displays of machinery, materials and appliances which will portray a complete cycle of the metal industry from the raw material to the finished product.

The societies co-operating in the preparation of the program for the technical sessions are the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, California Division of Development and Production Engineering of the American Petroleum Institute, American Welding Society, Society of Automotive Engineers,

Pacific Coast Electrical Association, Pacific Coast Gas Association, Institute of Marine Engineers, Metal Trades and Manufacturers Association, Chamber of Mines and Oils, National Purchasing Agents Association, and the American Society for Steel Treating.

P. R. R. Yard at Crestline

The new \$2,000,000 freight classification yards of the Pennsylvania at Crestline, Ohio, which were opened on August 15, are expected to decrease the length of time required for the movement of freight from the East to Chicago and points west by 24 hours. Cars classified at Crestline will be ready for delivery in Chicago without further switching. A delegation of 500 Crestline business men headed by I. Waldauer, mayor of Crestline, and S. F. Trimble, president of the Chamber of Commerce, attended the opening ceremonies at which the first freight car was sent over the hump. J. F. McMahon, editor of the Crestline Advocate, acted as spokesman for the Crestline business men in congratulating the Pennsylvania on its new facilities. An airplane flew overhead during the ceremonies, scattering printed greetings to the railroad. W. C. Higginbottom, general superintendent of the Northwestern division of the Pennsylvania, headed the party of Pennsylvania officers who attended the formal opening.

N. Y. Port Authority and Carriers Confer on Station

Railway executives of lines entering New York have appointed a contact committee to confer with representatives of the Port of New York Authority for the purpose of studying that body's modified plan for freight handling in the metropolitan district. The original plan of the Port Authority contemplated nine off-track inland stations in New York City, the stations to be used by all roads entering the district. Since the railways were unwilling to endorse this project, the plan has recently been modified and now calls for one station to be constructed and operated experimentally. Also, any group of two or more roads may be accommodated

dated in the station under the modified plan. Under the previous plan the Port Authority proposed to bring all roads serving New York into its projected stations.

The action of the carriers in agreeing to study the plan carries no commitment at this time that any group of them will agree to enter the proposed station.

Railroad "Power" Described for the Laity

"The Story of the Locomotive" is the sub-title of a 40-page booklet 5½ in. x 7½ in. entitled "Power" which has been issued by the Pennsylvania recounting the history of the development of the locomotive on that road from 1831—when the John Bull, the first locomotive in America with horizontal cylinders, made its initial trip on the Camden & Amboy, now a part of the Trenton division of the Pennsylvania. The distinguishing feature of this booklet is its style; that is to say, the author is a woman—Katherine Woods—and the descriptive matter, while unexceptionable from an engineering standpoint, at the same time has the characteristics of the feminine magazine writer. The book is illustrated with 19 pen-and-ink drawings, designed to idealize various features of the locomotive in accordance with the tastes or supposed tastes of the non-technical reader. These drawings, as well as the text, are true to life, though railroad readers may feel a slight doubt when they see the one that shows the engineman in the cab on the left-hand side and grasping the throttle with his right hand.

A. R. A. Safety Circulars

Danger and inconvenience from loose papers around freight car doors is the topic of Circular No. 207, issued by the Safety Section of the American Railway Association, B. G. Phillips, chairman, suggesting to railroads the propriety of looking after the practice at stations, and among consignees, in unloading flour, sugar, etc., from cars on which paper has been applied around the doors to protect the lading from the weather. Such paper should be entirely removed, when the car is unloaded; to leave scraps of the paper flying may obscure the engineman's view along his train.

Circular No. 208, from the same source, calls attention to the fact that many privately owned freight cars, especially meat and tank cars, have been found to have hand-brakes not in good order. Brake chains of excessive length and cars with insufficient clearance between the brake shaft and the step, have been reported as leading to mishaps where switchmen and other persons have been injured.

Rock Island Increases Pay of Clerks

About 6,000 employees of the Chicago, Rock Island & Pacific coming under the general classification of clerical workers have been granted wage increases varying from \$5 to \$7 per month and from 2 to 2½ cents an hour. The agreement, which was signed by L. C. Fritch, W. H. Burns,

and F. D. Reed, vice-presidents of the Rock Island, for the railroad and by J. Y. McLean, general chairman of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, for the clerks, on August 17, is retroactive to June 1, 1928, and involves an annual increase in the railroad payroll of about \$450,000. The wage dispute, in conformity with the provisions of the Railway Labor Act, was originally submitted to mediation on March 15 with T. E. Bickers of the United States Mediation Board serving as mediator.

Chief clerks, foremen and assistant foremen at warehouses, stores and stations and clerks and clerical workers at the same points were granted an increase of \$7 per month; and gatemen, train announcers and telephone switchboard operators \$5 per month. Baggage and mail handlers received an increase of 2½ cents an hour while janitors, elevator operators, office, station and warehouse watchmen, engine-crew callers and warehouse station truckers, callers, stowers, coopers, scalers, loaders, material handlers, motor operators, wheel rollers, scrap sorters, gang leaders, counter-men, oil house attendants and delivery men received an increase equivalent to 2 cents an hour. No increases were given to clerks with experience less than one year in railroad clerical work or to office boys, messengers and others whose work is classed as of an apprentice nature.

Shippers Endeavor to Avert Strike

Numerous shippers and civic organizations have intervened in the wage controversy now pending between western railroads and their trainmen and conductors, appealing to the United States Mediation Board to exercise its power to avert a strike which is threatened by the taking of a strike vote which began on August 14. The strike ballots are returnable to Chicago by September 2 where they will be counted.

The Duluth Board of Trade, the Duluth Traffic Commission, iron ore interests and other shippers at Duluth, Minn., telegraphed to the Mediation board on August 16 asking that body to take immediate action and call on President Coolidge to appoint a special board to act in the emergency. An immense wheat crop is ready to be moved, ore shipments are lagging and with other business at a high pitch for railroads, "a tieup would work incalculable damage to the entire Northwest."

St. Paul (Minn.) shippers and the St. Paul Association and representatives of Kansas City (Mo.) shippers have also petitioned the Mediation board and the President to take steps to avert a strike.

The Illinois Manufacturers' Association sent a telegram to Chairman Winslow, of the United States Board of Mediation, strongly urging the Board to do everything in its power to prevent a walkout of the men. "A strike would result in a demoralizing interruption of traffic, the closing of factories, . . . and would be a tremendous calamity for the public as well

as the industries and all other shippers, including the farmers. . . ."

At Superior, Wis., it was announced that although requests from private sources have reached President Coolidge, to act, he is leaving the matter entirely in the hands of the Mediation board.

On September 4 representatives of the Brotherhood of Railroad Trainmen and the Order of Railway Conductors will meet with the Conference Committee of Managers of the western railroads at Chicago to place the results of the vote before them and to attempt a further settlement of the wage demands before any possible strike action is taken by the Brotherhoods.

The Chicago and Alton on August 21 reached an agreement with its trainmen and conductors who are members of the brotherhoods under which any increase in wages which may be obtained by strike or by mutual agreement by train service employees on the other western railroads will be granted on the Alton retroactive to May 1, 1928. The Alton was not represented on the conference committee of managers which has been negotiating with the brotherhoods and this agreement removes the employees on that railroad from participation in a strike and at the same time assures them of equal treatment with other train service employees as far as a wage increase is concerned.

Tie Exports in 1927

Railroad ties, exported from the United States during 1927, totalled 3,550,393, and were valued at \$3,560,345, according to statistics published by the U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. These figures, which cover both hardwood and softwood, treated and untreated ties, compare with 3,760,613 ties, valued at \$3,507,629, exported in 1926 and thus show a decrease in number of 210,220 ties, but an increase in value of \$52,716. During 1925 and 1926 the average value of each tie exported was under \$1 while in 1927 it was slightly above that figure.

Of the 1927 total, 223,849 were hardwood ties, valued at \$228,729. Canada was the largest consumer of these, taking 141,241 or 63 per cent of the total, while Mexico was second with its consumption of 49,520. Peru, which imported no hardwood ties from the United States in 1926, was the third largest market in 1927, taking 20,000. The United Kingdom took only 4,561 ties of this type, although it is the largest market for American hardwoods as a whole.

Of the total tie exports, 2,487,646, valued at \$2,140,937 or approximately 70 per cent, were untreated softwood ties. This is a decrease of 130,050 ties of this class from the 1926 figure. Mexico was the principal importer of these, taking 789,212 as against 1,060,355 which it took in 1926. China and Peru were second and third, taking 468,977 and 456,329, respectively, of the 1927 total.

Creosoted or otherwise preserved ties accounted for 838,898 or 23 per cent of the 1927 export total and were valued at \$1,190,679. As compared with 1926, this

is a decrease in numbers of 109,735, but an increase of \$99,394 in value. Canada, which took 380,582 or more than 45 per cent of the total, was the largest 1927 market for the treated ties. Honduras was second and Guatemala third, the former taking 116,244 and the latter 88,925.

General Foremen's Convention Program

The program for the 1928 convention of the International Railway General Foremen's Association, to be held at the Hotel Sherman, Chicago, September 18 to 21, inclusive, has been carefully developed, and promises to be one of the most instructive and inspiring of any presented by this association in recent years. Both car and locomotive subjects will receive attention, and the caliber of the speakers selected assures the presentation of much valuable information. The program is as follows:

TUESDAY, SEPTEMBER 18

Convention called to order at 9:30 a. m. by President F. M. A'Hearn, general foreman, Beasmer & Lake Erie, Greenville, Pa.
Invocation
Address on Worlds Fair, representative of the Chicago Chamber of Commerce
Address by President A'Hearn
Report of secretary-treasurer, William Hall, Winona, Minn.
Appointment of committees
Adjournment to view exhibits

AFTERNOON SESSION

Call to order, 2:00 p. m.
Topic No. 1, "Reduction of Federal Defects"
Address by A. G. Pack, chief inspector, Bureau of Locomotive Inspection
Interstate Commerce Commission, Washington, D. C.
Response
Discussion of Topic No. 1
Adjournment

WEDNESDAY, SEPTEMBER 19

Meeting called to order, 9:30 a. m.
Address by E. A. Workman, Manager, Purchases & Stores, Central Railroad of New Jersey, New York.
Response by R. J. Farrington, general foreman, Pittsburgh & Lake Erie
Topic No. 2, "General Foremen's Responsibility for Inactive Stock"
Discussion
Adjournment to view exhibits
AFTERNOON SESSION
Meeting called to order, 2:00 p. m.
Address by R. V. Wright, editor, Railway Mechanical Engineer, New York
Response by J. W. Gibbons, general foreman, Atchison, Topeka & Santa Fe, Topeka, Kansas
Topic No. 3, "How to Improve Personnel Relations"
Discussion
Election of officers
Adjournment

THURSDAY, SEPTEMBER 20

Meeting called to order, 9:30 a. m.
Topic No. 4, "General Foremen's Contribution to Long Runs"
Discussion
Adjournment

AFTERNOON SESSION

Meeting called to order, 2:00 p. m.
Address by C. W. Gallaway, vice-president, Baltimore & Ohio, Baltimore, Md.
Response by A. H. Keys, general foreman, Baltimore & Ohio, Baltimore, Md.
Topic No. 5, "How to Get More Miles Per Car Per Day"
Discussion
Adjournment

FRIDAY, SEPTEMBER 21

Meeting called to order, 9:30 a. m.
Address by A. J. Kiueger, master car builder, New York Chicago & St. Louis, Cleveland, Ohio
Response by A. T. Streeper, general foreman, New York, Chicago & St. Louis, Cleveland, Ohio
Topic No. 6, "Passenger and Freight Car Repair Classification"
Discussion
Reports of committees
Unfinished business
New business

Traffic

The Southern Pacific, in conjunction with the Tahoe Transportation Company, has established a daily motor coach service to all of the points around Lake Tahoe. This service connects with the Southern Pacific's trains and motor coaches at Tahoe station and accommodates travelers, who are not desirous of taking a boat ride.

Single-room sleeping car service has been inaugurated by the Canadian Pacific on its trains between Montreal and Toronto, and Montreal and Quebec. Each car contains 14 rooms fitted with beds on the model of sleeping cars used in Great Britain. Facilities are also provided for reading and writing. Rooms are arranged so that they may be had singly or en suite with communicating doors. These accommodations may be had for twice the regular lower berth fare on a single ticket.

The Chicago Association of Commerce, in an effort to increase the average carload, has sent bulletins to receivers and shippers of freight asking them to assist in the movement. *They are requested, whenever possible, to buy in carloads rather than in specified quantities and to load cars to their maximum capacity where not limited by receivers' requirements.* It is also recommended that industrial traffic managers require their loading and unloading forces to issue a daily statement of cars loaded and received, showing car capacity and percentage of capacity utilized.

The Pennsylvania's directory of through package cars, giving, for each leading shipping point, a list of all the cities and transfer stations to which cars for l.c.l. freight are regularly dispatched, has been re-issued (bringing all items up to date) with special reference to the requirements of shippers on the New York, New Haven & Hartford. The first three pages show the movements of the fast limited freight trains of the Pennsylvania as related to the 25 or more principal places on the New Haven System. The New England freight agent of the Pennsylvania is Charles F. Nye, 80 Federal Street, Boston.

In the Federal Court at Mobile, Ala., August 18, the application of the St. Louis-San Francisco for an injunction to prevent the Alabama Public Service Commission from interfering with the road's action in discontinuing two local passenger trains, was denied. The two trains referred to run between Carbon Hill, Ala., and Amory, Miss., and, according to press reports, the Federal judges approve the action of the Alabama Commission in taking jurisdiction over the question of the need of these trains, notwithstanding the fact that they are interstate trains. It appears that about 15 miles of the route traversed by these trains lies in the state of Mississippi, and 49 miles in Alabama.

Frisco Passenger Service to Pensacola

Through passenger service on the St. Louis-San Francisco, from St. Louis, Mo., and Kansas City to Pensacola, Fla., over the Frisco's recently completed extension from Aberdeen, Miss., to Pensacola, will be established on September 2. The new service will be operated in connection with the "Sunnyland." Pensacola cars will leave St. Louis at 1:55 p.m. on the "Sunnyland," arriving at Memphis at 9:20 p.m. The "Sunnyland" from Kansas City, also carrying Pensacola cars, will arrive at Memphis at 9:00 p.m. and join the St. Louis-Sunnyland, leaving there at 9:35 p.m. The train will arrive at Pensacola at noon the second day. On the return trip the train will leave Pensacola at 4 p.m., arriving at Memphis at 7:30 a.m. the next morning; St. Louis at 3:15 p.m. the same afternoon and Kansas City at 8:30 p.m. the same evening.

Freight Traffic for Six Months Shows Decrease

The volume of freight handled by the Class I railroads during the first six months this year amounted to 223,845,340,000 net ton-miles, according to reports compiled by the Bureau of Railway Economics. This was a decrease of 10,158,687,000 net ton-miles or 4.3 per cent under that of the corresponding period in 1927 as well as a decrease of 1.4 per cent under that of the same period in 1926.

In the Eastern district there was a decrease of 8.1 per cent, while the Southern district reported a decrease of 8.5 per cent. The Western district reported an increase of 3.1 per cent.

For June, the volume of freight handled by the Class I railroads amounted to 37,303,710,000 net ton-miles, a decrease of 1,173,201,000 net ton-miles, or 3 per cent below the total for the corresponding period last year and a decrease of 5 per cent below that of the same month in 1926.

Railroads in the Eastern district for June reported a decrease of 4 per cent, while the Southern district reported a decrease of 10.1 per cent. The Western district reported an increase of 1.1 per cent. The average daily movement per freight car for the first six months of 1928 was the highest for any corresponding period on record, amounting to 30 miles per car day. This was an increase of one-tenth of a mile over the corresponding period last year and an increase of one mile over the same period in 1926.

The daily average movement for June this year was 30.4 miles, which also established a new high mark for any corresponding month on record. This exceeded by four-tenths of a mile the average for the same month last year and was also an increase of three-tenths of a mile over June, 1926.

The average load per car for the first six months this year was 26.3 tons, a decrease of one ton below the average for the first half of 1927 and a decrease of six-tenths of a ton below that for 1926. The average load per car for June was 26.3 tons, compared with 27 tons in June last year and 27.3 tons in June, 1926.

Equipment and Supplies

Locomotives

THE ALGOMA CENTRAL is inquiring for two 2-10-2 type locomotives.

THE NATIONAL RAILWAYS OF MEXICO have ordered 6 Mallet 2-6-6-2 type locomotives, from the American Locomotive Company.

THE ERIE has ordered one 300-hp. oil-electric locomotive to be manufactured jointly by the Ingersoll-Rand Company, the General Electric Company and the American Locomotive Company. Inquiry for this locomotive was reported in the *Railway Age* of April 28.

Freight Cars

THE WABASH has ordered 10 hopper cars from the American Car & Foundry Company.

THE ANGLO-MEXICAN PETROLEUM CO., LTD., is inquiring for 8 tank cars of 7,000 gal. capacity.

THE SOUTH PORTO RICO SUGAR COMPANY has ordered 10 cane cars and 20 flat cars of 30 tons' capacity, from the Magor Car Corporation.

THE INTERNATIONAL RAILWAYS OF CENTRAL AMERICA have ordered 25 banana cars of 20 tons' capacity, from the Magor Car Corporation.

THE BARRETT COMPANY has ordered 15 class 105 A tank cars of 50,000 lb. capacity, from the General American Tank Car Corporation, and 15 from the American Car & Foundry Co. These cars will be used for carrying anhydrous ammonia.

THE NORTH AMERICAN CAR COMPANY has ordered 100 steel underframes from the Pressed Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of May 19.

THE SANITARY DISTRICT OF CHICAGO has rejected all bids on the 54 air dump cars, reported in the *Railway Age* of August 14, and has issued new inquiries for 16 air dump cars of 30 cu. yd. capacity, and 4 air dump cars of 20 cu. yd. capacity.

Passenger Cars

THE BANGOR & AROOSTOOK is inquiring for 2 combination baggage and mail cars.

THE CANADIAN PACIFIC has completed work at its Angus shops on 6 over-night single-room compartment cars. Work has also been finished on 8 first-class cars at the Angus shops; the frames for these cars were supplied by the Canadian Car & Foundry Company.

THE SOUTHERN PACIFIC has ordered 4 gas-electric cars. Two bodies will be built

by the Bethlehem Steel Company and one body by the Pullman Car & Manufacturing Corporation, while the three units will be constructed by the Electro-Motive Company. One car equipped with a Sterling Westinghouse unit will be built by the Standard Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of July 28.

Machinery and Tools

THE CHICAGO, BURLINGTON & QUINCY is inquiring for one 18-in. lathe.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for one 48-in. radial drill.

THE MISSOURI-KANSAS-TEXAS is inquiring for 2 axle lathes.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC is inquiring for one frog and switch planer.

THE NEW YORK CENTRAL has ordered a 24-in. lathe and a 14-in. lathe from Manning, Maxwell & Moore, Inc. This company is also inquiring for an axle lathe and a geared head lathe.

SEVERAL RAILWAY COMPANIES have placed orders with the Niles-Bement-Pond Company for machine tools as follows: A 100-lb. Bradley hammer; 13 special Ransom grinders; a No. 116 Ransom grinder and a No. 110 Ransom grinder; an Acme two-inch bolt cutter.

Signaling

THE CHESAPEAKE & OHIO has ordered from the Union Switch & Signal Company, material for the installation of electro-pneumatic interlocking at OB cabin, Covington, Ky.; a 23-lever machine. Color-light signals will be used.

THE NEW YORK, ONTARIO & WESTERN has ordered from the Union Switch & Signal Company, material for the installation of automatic block signaling on a piece of track, two miles long, at Fulton, N. Y., where New York Central trains use the N. Y., O. & W. track. The order includes 11 color-light signals and one low-voltage switch movement. Between 9 a.m. and 11 p.m., the signals of this line, together with the switch at the junction of the New York Central, are operated by the operator in Fulton station by interlocked table levers. After the office is closed at 11 p.m., the switch is set normally for the N. Y., O. & W. line and the junction signals are inoperative. The remaining signals then function automatically as in any APB system.

THE RAILWAYS of Spain must henceforth insure passengers against accidents, the government having issued an order making such insurance compulsory. The premium, regardless of distance traveled, will be, on a third class ticket, 1½ cents; on a second class ticket, three cents, and on a first class ticket, 4½ cents. The indemnities range from £375 to £1700. The government proposes also to prescribe compulsory insurance of cattle in transport.

Supply Trade

The Signal Accessories Corporation, Utica, N. Y., has appointed the A & H Corporation, Marquette building, Chicago, as Western representative, succeeding the late Mr. Hough.

Joseph E. Brown, eastern sales manager of the Central Valve Manufacturing Company, Chicago, with headquarters at New York, has been elected vice-president, with headquarters in the Railway Exchange building, Chicago.

John H. Bode, president and general manager of the Wellman-Seaver-Morgan Company, Cleveland, Ohio, has resigned and will be succeeded by George W. Burrell, formerly vice-president, who retired two years ago after 27 years affiliation with the company.

Alban Frederick Morris, who has been elected president of the Morgan Engineering Company, Alliance, Ohio, was born at Alliance, Ohio, and after graduating from high school, entered the employ of the Morgan Engineering Company as an office boy. After working in various offices of the company he was appointed paymaster, after which he was employed in the estimating and cost department and then in the sales department. In 1903 he was appointed sales manager and in 1923, vice-president and sales manager, which position he has held until his recent election.

Trade Publication

THE WESTON ELECTRICAL INSTRUMENT CORPORATION, Newark, N. J., has issued a 16-page bulletin describing its electric speed indicators for locomotives and passenger cars, and also its vacuum tube emission tester for the Type-PJ tubes employed in automatic train control.

TWENTY PERSONS burned to death and 30 or more injured, is the record of a derailment reported in press dispatches of August 16, as having occurred at Presdova, Serbia. The derailment resulted in crushing the cars and forcing one upon another to the extent that many of the passengers were imprisoned until the fire, starting soon after the derailment, overcame them.

OPERATING REVENUES equivalent to approximately \$85,300,000 and operating expenses equivalent to \$78,600,000 were reported by the Austrian Federal Railways for 1927. These figures compare with revenues of \$82,000,000 and expenses of \$77,700,000 in 1926. At the close of the year, there were in operation 4,863 kilometers or 3,022 miles of line; 1,479 kilometers or 919 miles of which were double track. Rolling stock in operation included 2,663 locomotives, 30,298 freight cars, 5,460 passenger cars and 1,715 service and mail cars.

Construction

ATLANTIC COAST LINE.—This road has awarded a contract to C. V. York, Raleigh, N. C., for the erection of a warehouse at Wilmington, N. C.

BIRMINGHAM, SELMA & MOBILE.—This company has applied to the Interstate Commerce Commission for permission to construct a 10-mile extension to its main line and a 22-mile extension to its branch line in Perry and Hale counties, Ala. The carrier proposes to finance construction and equip the new extensions by the sale of \$175,000 of first mortgage 6 per cent gold bonds.

CANADIAN NATIONAL.—This company plans the construction of a passenger station at Weyburn, Sask., at a cost of about \$25,000.

CHESAPEAKE & OHIO.—This company has applied to the Interstate Commerce Commission for a reconsideration of its recent decision by which it was denied authority for an extension of its line in the Guyandot Valley of West Virginia while certificates for new construction in the valley were granted to subsidiaries of the Norfolk & Western and Virginian. On August 20 the commission announced a postponement for 30 days of the effective date of its orders.

DELAWARE & HUDSON.—This company has given a contract to F. H. Clement & Company, Bethlehem, Pa., for the elimination of a grade crossing, at Delmar, N. Y. The cost of this work is \$173,000. An item regarding this work appeared in the *Railway Age* of August 4.

ERIE.—This road has awarded a contract to Allan N. Spooner & Son, Inc., New York, for the erection of a railway mail building at Jersey City, N. J. A second contract for the construction of an underpass under its four tracks at the crossing of the new state highway near Rutherford, N. J., station was awarded to Arthur McMullen Company, New York.

FORT SMITH & WESTERN.—This company has asked the Oklahoma Corporation Commission for permission to reconstruct its bridge over the South Canadian river near Hanna, Okla., in order to accommodate vehicular traffic as a toll bridge.

KANSAS CITY SOUTHERN.—A contract has been let to the List Construction Company, Kansas City, Mo., for the grading and construction of bridges for a line between Grandview, Mo., and Leeds, 13 miles. Track laying and ballasting will be done by company forces. The cost of the entire project is estimated at \$3,000,000. This project will provide the Kansas City Southern with its own entrance into Kansas City over a line which will have a maximum grade of 0.5 per cent. Plans call for the separation of grades with each of the 25 highways crossed on the line.

MISSOURI PACIFIC.—This company contemplates the construction of a car and

locomotive repair shop at Nettleton, Mo., to cost approximately \$100,000.

NORTHERN PACIFIC.—The Minnesota Railroad and Warehouse Commission has approved the plans of this railroad and the city of Duluth (Minn.) for the construction of a highway viaduct over the railroad's tracks between Raleigh street and Fifty-fifth avenue, west, and Le Sue street in that city. The viaduct will carry a new highway to serve as an approach to the Arrowhead Interstate bridge.

PENNSYLVANIA.—This road has under consideration the construction of a commercial office building at Philadelphia, in the block between 16th and 17th streets on the north side of the proposed Pennsylvania boulevard. This new boulevard, as has already been announced, will extend along the bed of what is now Filbert street, from 15th street and the Parkway, to the new Pennsylvania station on the west bank of the Schuylkill river.

SEABOARD AIR LINE.—This road has awarded a contract to C. V. York, Raleigh, N. C., for the erection of a packing house at Leesburg, Fla. The project is expected to cost approximately \$40,000. A second contract for the erection of a packing house at Wintergarden, Fla., went to the Elliott Bridge Company, Hickory, N. C.

SOUTHERN PACIFIC.—A contract has been awarded to the Utah Construction Company for the construction of the first 12-mile unit of a line between Klamath Falls, Ore., and Alturas, Cal.

TEXAS & NEW ORLEANS.—Examiner H. C. Davis of the Interstate Commerce Commission, in a proposed report, recommends that the commission deny this company's application for authority to acquire a 2-mile line in Lafourche parish, La., and construct an extension of 1 mile to connect the line of the Morgan's Louisiana & Texas with two sugar refineries, on the ground that they are served by the Texas & Pacific and that if additional service can be accomplished under trackage rights the extension is not justified.

New Lines Authorized

The Interstate Commerce Commission has authorized the construction of new lines of railroad as follows:

TEXAS-NEW MEXICO.—authorized to construct a 23-mile line from Monahans, Tex., north and west through Wink to the Texas-New Mexico State line.

VIRGINIAN.—authority granted to subsidiary, the Virginian & Western, to construct a 40.6-mile line from Itman, W. Va., to Gilbert.

NORFOLK & WESTERN.—authority granted to a subsidiary, the Guyandot & Tug River, to construct a 10.5-mile line from Gilbert, W. Va., to Wharnccliffe.

THE ROMNEY, HYTHE & DYMCHURCH, the fifteen-inch gage railroad on the southeastern coast of England, recently noticed in the *Railway Age*, has now been running a whole year; and for the 12 months, the number of passengers carried was 287,005. The great majority of the passengers on this road are visitors to seaside resorts. These resorts, however, are reached also by omnibuses. The railroad carries merchandise as well as passengers.

Financial

COLORADO & SOUTHERN.—*Abandonment.*—The city and county of Denver, Colo., in an application to the Interstate Commerce Commission, asks that a certificate be issued authorizing the abandonment of part of this company's Platte Canyon line from Waterton to Buffalo, Colo., 19.2 miles, narrow-gage, so as to make the canyon site available for the construction of a reservoir.

COWLITZ, CHEHALIS & CASCADE.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue \$60,000 general and refunding 6 per cent bonds to be sold at par to retire promissory notes.

MAINE CENTRAL.—*Bonds.*—The Interstate Commerce Commission has authorized the Portland & Ogdensburg to issue \$2,119,000 of 4½ per cent first mortgage bonds to be sold at not less than 96, the Maine Central to assume obligation and liability with respect to these bonds and the Portland Terminal to consent to the issue and to the mortgage securing them.

MERIDIAN & BIGBEE RIVER.—*Notes.*—The Interstate Commerce Commission has authorized this company to issue and re-issue within a two-year period \$25,000 of promissory notes.

MISSISSIPPI EASTERN.—*Denial of Application to Operate Line.*—The Interstate Commerce Commission has denied the application of this company for authority to operate a line from Crandall, Miss., to Cliff Williams, 25 miles.

NORFOLK & WESTERN.—*Construction and Operation.*—The Interstate Commerce Commission has authorized the Big Sandy & Cumberland, a subsidiary of this company, to construct and operate a branch extending southwesterly from Hurley, Va., 14.1 miles to a fork of the Big Sandy river and to reconstruct and operate a narrow-gage industrial track running 13.3 miles northwesterly from Grundy.

PENNSYLVANIA.—*Acquisition of Tunnel Company.*—The Interstate Commerce Commission has authorized this company to acquire control of the Pennsylvania Tunnel & Terminal Railroad by lease. The latter company owns the tunnel line serving Pennsylvania station, New York, and all its stock is owned by the applicant.

SEABOARD AIR LINE.—*Acquisition.*—Examiner Thomas F. Sullivan of the Interstate Commerce Commission has recommended, in a proposed report, that the commission authorize the acquisition of control of the Prince George & Chesterfield by purchase of capital stock and by lease and the construction of a line from a connection with the Seaboard at Bellwood, Va., to Hopewell, Va., 16 miles.

SOUTHERN PACIFIC.—*Equipment Trusts.*—The Interstate Commerce Commission

has authorized this company to assume obligation and liability in respect of \$4,815,000 equipment trust certificates, series K, to be issued by the Bank of North America & Trust Company and sold at not less than 98¾.

TRINITY & BRAZOS VALLEY.—Receiver's Certificates.—The Interstate Commerce Commission has authorized the receiver to issue \$93,107 of fourth-series receiver's certificates, to be sold at face value and the proceeds used for ballasting 28 miles of track.

VIRGINIAN & WESTERN.—Construction Authorized.—The Interstate Commerce Commission has authorized this company to construct a line from Itman, W. Va., to a connection with the Chesapeake & Ohio at Gilbert, 40.6 miles. This company is a subsidiary of the Virginian.

WESTERN OF ALABAMA.—Bonds.—The Interstate Commerce Commission has authorized this company to issue \$1,543,000 of first mortgage bonds, bearing interest at 4½ per cent, to be sold for not less than 97½.

WESTERN MARYLAND.—Abandonment.—The Interstate Commerce Commission has authorized this company to abandon a portion of a branch line from Cold Spring, Pa., to Hanover Jct., 3 miles.

Average Prices of Stocks and of Bonds

	Aug. 21.	Last week	Last year
Average price of 20 representative railway stocks..	121.61	116.98	119.20
Average price of 20 representative railway bonds..	92.33	91.85	95.22

Dividends Declared

Alabama & Vicksburg.—3 per cent, payable October 1 to holders of record September 8.

Chesapeake & Ohio.—Common, \$2.50, quarterly, payable October 1 to holders of record September 8.

Chesapeake & Ohio.—Preferred, Series A, \$3.25, semi-annually, payable January 1 to holders of record December 8.

Consolidated Railroads of Cuba.—Preferred, 1½ per cent, quarterly, payable October 1 to holders of record September 10.

Cuba Northern.—Common (No. 1) \$4.40, payable September 28 to holders of record September 28.

North Pennsylvania.—\$1, quarterly, payable August 25 to holders of record August 20.

RAILWAY LABOR UNIONS of Great Britain have agreed with the four amalgamated railway companies to accept a wage reduction of two and one-half per cent for all classes of employees. A like reduction was accepted by directors and chief officers of the companies. The reduction became effective August 13, and will be operative for a period of 12 months with provision for termination by either side on three months' notice. The immediate result of the reduction will be an annual saving of £2,500,000 in labor cost to the companies. It is expected that these savings will aid in rehabilitating the general credit of the roads. More than 650,000 employees of the four companies are affected.

Officers

Financial, Legal and Accounting

Thaddeus G. Benton, has been appointed treasurer of the Louisiana & Northwest, with headquarters at New York, succeeding **William Tallman**, deceased.

Victor F. Steinberg, who has been promoted to treasurer of the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo., was paymaster for 12 years before this promotion instead of trainmaster as reported in the *Railway Age* of August 18.

Operating

Thomas J. Regan, trainmaster on the Northern Pacific, with headquarters at Glendive, Mont., has been transferred to Missoula and will be succeeded by **Edgar J. Brierley**, trainmaster at Dilworth, Minn., who in turn will be succeeded by **Edwin H. Briley**.

F. L. Davis, trainmaster of the Logansport division of the Pennsylvania, with headquarters at Logansport, Ind., has been appointed service inspector in the office of the superintendent of freight transportation, with headquarters at Chicago, and will be succeeded by **J. B. Hays**, assistant trainmaster, Eastern division, with headquarters at Pittsburgh.

W. H. Schoonover, chief transportation clerk of the Lake division of the Pennsylvania with headquarters at Cleveland, Ohio, has been appointed supervisor of freight train service, with headquarters at Pittsburgh, Pa. and will be succeeded by **J. F. Allenspaugh**, assistant trainmaster of the Panhandle division, who in turn will be succeeded by **J. T. McCarthy**, general yardmaster at Buffalo, N. Y.

William B. Kirkland, who has been promoted to superintendent of the New Mexico division of the Southern Pacific, with headquarters at El Paso, Tex., has been in the service of that company for about 25 years. He was born at Quitman, Miss., on April 5, 1886, and attended high school and business college in 1902 and 1903. Mr. Kirkland first entered railway service on July 1, 1902, with the New Orleans & North Eastern as a clerk in the freight station at Laurel, Miss., during summer vacation. Later in 1902 he served with the Western Union Telegraph Company at Laurel as a clerk and telegraph operator after school hours. In May, 1903, Mr. Kirkland entered the service of the Mobile & Ohio as a telegraph operator, acting in that capacity at various points

until December of the same year when he became a telegraph operator on the Southern Pacific in Arizona and New Mexico. From October, 1906, to November, 1924, he served successively as a train dispatcher on the Tucson division at Tucson, Ariz., as assistant chief dispatcher at the same point, as chief dispatcher on the Shasta division at Dunsmuir, Cal., as trainmaster and then as assistant superintendent at the same point, as trainmaster on the Stockton division at Stockton, Cal., as trainmaster on the Sacramento division at Sacramento, Cal., and as acting assistant superintendent of the Sacramento division. Mr. Kirkland was then promoted to assistant superintendent of the Rio Grande division, with headquarters at El Paso. His promotion to superintendent of the New Mexico division became effective on July 1.

Traffic

R. H. Dorsey has been appointed general agent of the **Beaver Meade and Englewood**, with headquarters at Hooker, Okla.

Ralph J. Brown, assistant general freight agent on the Southern, with headquarters at Atlanta, Ga., has been appointed general freight agent, with the same headquarters, succeeding **J. W. Bray**, who has resigned to become a member of the Standing Rate Committee of the Southern Freight Association. **C. D. Thomas**, assistant general freight agent at Cincinnati, O., has been transferred in the same capacity to Atlanta, replacing Mr. Brown. **C. B. Walker** has been appointed assistant general freight agent at Cincinnati, succeeding Mr. Thomas.

Engineering, Maintenance of Way and Signaling

Pusey Jones, chief structural draftsman of the Boston & Maine at Boston, Mass., has been appointed assistant structural engineer on the staff of the chief engineer of the Cincinnati Terminal Improvement at Cincinnati, Ohio.

Bernard Blum, engineer of maintenance of way of the Northern Pacific lines east of Paradise, Mont., with headquarters at St. Paul, Minn., has been promoted to chief engineer, with headquarters at the same point, succeeding **H. E. Stevens**, who on August 10 was appointed vice-president in charge of operation. The positions of engineer of maintenance of way of the eastern and western lines have been abolished and **A. F. Stotler**, who was assistant chief engineer and engineer of maintenance of way of the lines west of Paradise, will have the title of assistant chief engineer of those lines, with headquarters as before at Seattle, Wash. **P. E. Thian**, valuation engineer, with headquarters at St. Paul, Minn., has been

promoted to consulting engineer of the Northern Pacific and the Northwestern Improvement Company, with headquarters at the same point, a newly created position. **A. C. Terrell** has been appointed valuation engineer to replace Mr. Thian. **J. T. Derrig**, district engineer of the lines east of Mandan, N. D., with headquarters at St. Paul, has been promoted to assistant to the chief engineer, with headquarters at the same point, a newly created position. **H. F. Brown**, assistant district engineer at St. Paul, has been promoted to district engineer to succeed Mr. Derrig.

Bernard Blum, who has been promoted to chief engineer of the Northern Pacific, with headquarters at St. Paul, Minn., has been in the service of the engineering department of that rail-



Bernard Blum

road since 1907. He was born on February 12, 1883, at Chicago and graduated from a course in civil engineering at the Massachusetts Institute of Tech-

nology in 1904. The following year he was an assistant instructor in that school, entering railway service in June, 1905, in the engineering department of the Chicago Junction at Chicago. Mr. Blum entered Northern Pacific service on March 1, 1907, as an assistant engineer. He was then advanced through a number of minor positions in the engineering department and on January 1, 1917, he was promoted to district engineer of the lines east of Mandan, N. D., with headquarters at St. Paul. On July 1, 1919, Mr. Blum was promoted to engineer of maintenance of way of the lines east of Paradise, Mont., with headquarters at St. Paul, a position he held until his promotion to chief engineer on August 20.

Mechanical

H. A. Currie, formerly assistant electrical engineer, New York Central, New York, N. Y., has been appointed electrical engineer and will assume the duties heretofore performed by the chief engineer of electric traction, this latter position having been abolished.

C. H. Temple, chief of motive power and rolling stock on the Canadian Pacific with headquarters at Montreal, Que., has retired from the service of that road after having served for over 40 years. **H. B. Bowen**, assistant superintendent of motive power and car department, with headquarters at Winnipeg, Man., will succeed Mr. Temple.

Obituary

Walter T. Spencer, superintendent of the Boston division of the New York,

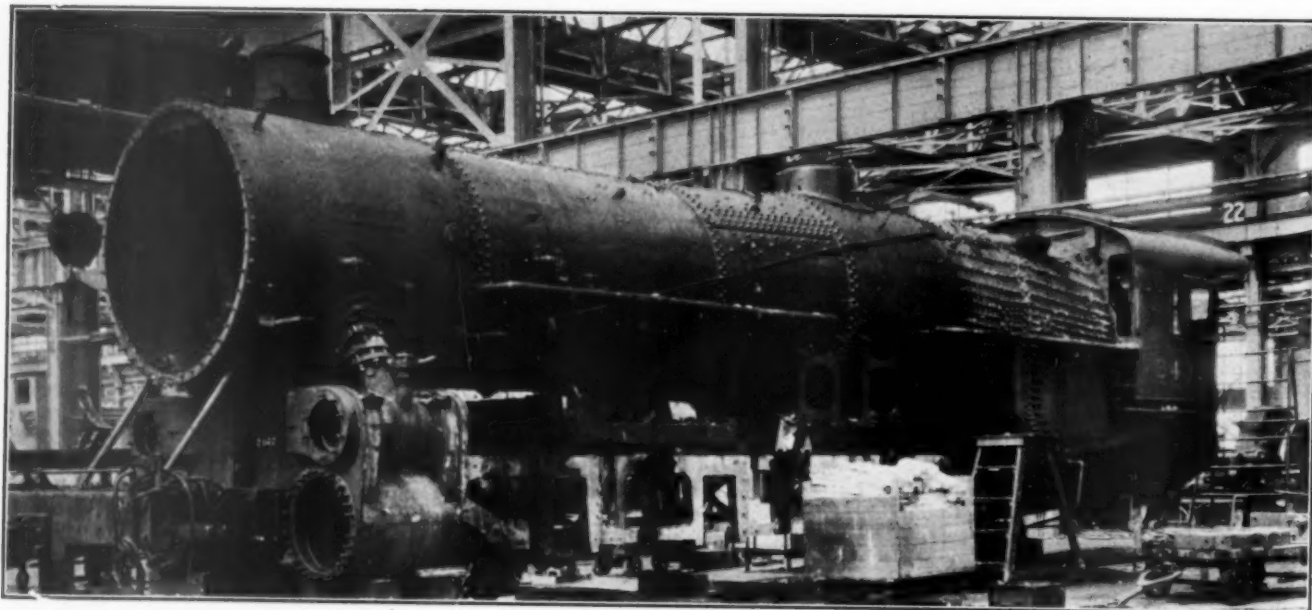
New Haven & Hartford, died on August 19, at his home in Brookline, Mass., after an illness of two weeks. Mr. Spencer had been with the New Haven since 1890.

James A. Morgan at one time associate counsel for the Erie and later counsel for the Northern Pacific, and formerly president of the New York & Palisade Railroad, died on August 15, at the age of 82. Mr. Morgan was also the author of various works on railway management.

Homer T. Dick, general solicitor of the Chicago & Eastern Illinois, with headquarters at Chicago, who died on August 11, after an illness of about three weeks, was born on November 9, 1870, at Fort Wayne, Ind., and was educated at Kent College of Law, Chicago. He entered railway service in 1888 with the Fort Wayne, Cincinnati & Louisville (now a part of the New York, Chicago, & St. Louis). From 1902 to 1910 he was district attorney for the Chicago & Eastern Illinois. From 1910 to 1914 he was general attorney and in the latter year was promoted to general solicitor, which position he held until his death.

ELECTRIFICATION of an additional stretch in the mountainous section of the Mexican Railway, connecting the port of Vera Cruz with Mexico City, has been completed. The new stretch of electrified road is between Cordova and Paso del Macho. Including previously completed sections, a total of 65 miles between Esperanza and Paso del Macho is now electrified. The grade of the electrified section is heavy, since, in the 65 miles the road rises from about 1,500 to 8,000 ft. above sea level.

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View of a Locomotive Being Overhauled in Modern Shop

Railway Age

Motor Transport Section
Devoted to the
Co-ordination of Railway and Highway Service

Vol. 85 August 25, 1928 No. 8



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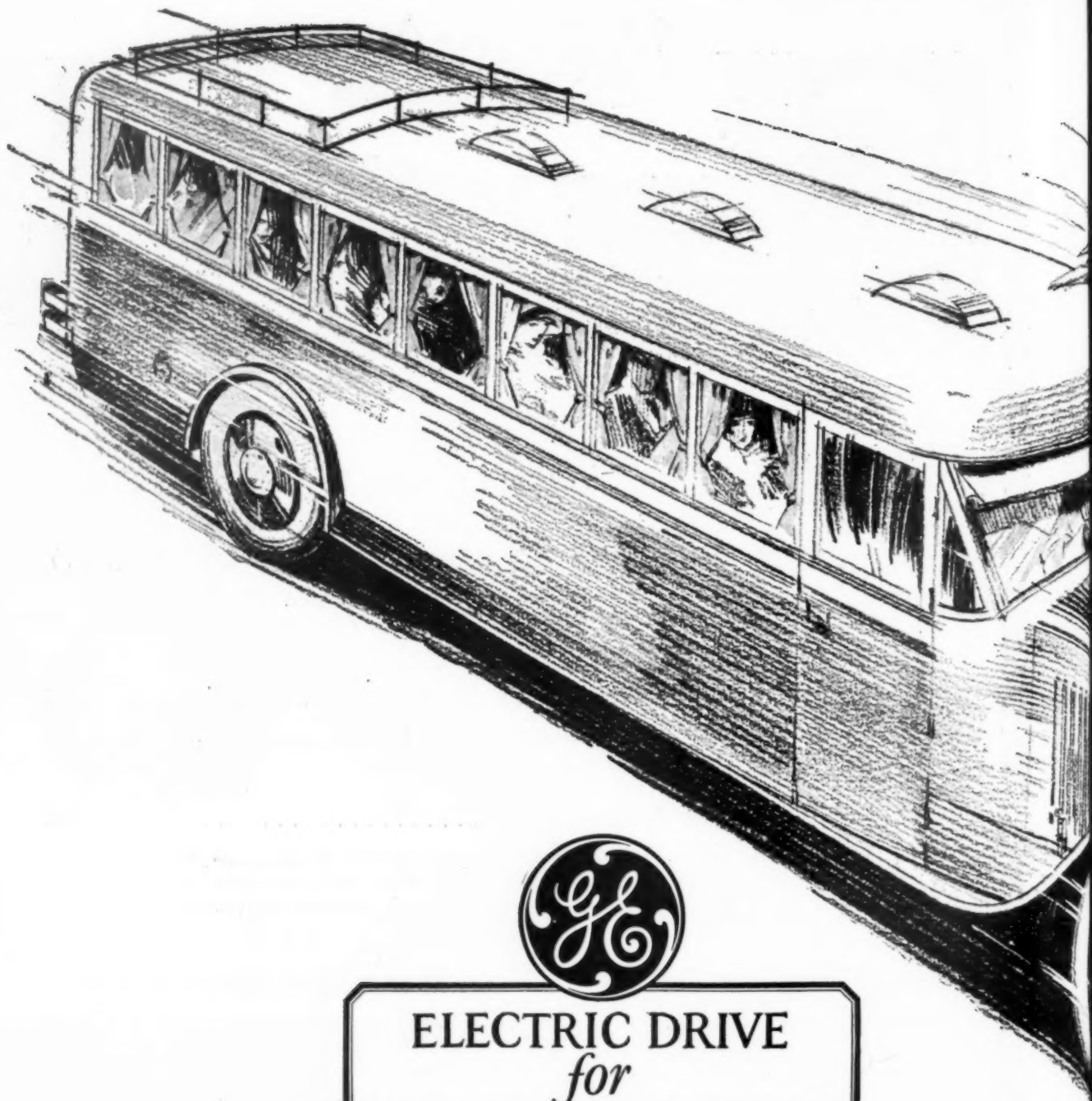
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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)



ELECTRIC DRIVE
for
GAS-ELECTRIC BUSES
AND TRUCKS

GENERAL
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

Railway Age

Motor Transport Section

*Devoted to the
Coordination of Railway and Highway Service*

Vol. 85, No. 8

August 25, 1928

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The Electric Railway Convention

ATTEENDANCE of the annual convention of the American Electric Railway Association by steam railway officers who are interested in new transportation methods will be well repaid this year as in the past. Each year has seen more representatives of steam railways at these conventions, which is a good indication that they are being found worth while. The electric railways in recent years have been showing a praise-worthy determination to improve their condition by bettering the service that they render. Many new methods are being tried, and experiments with new types of equipment are being carried on. Reports on the results of such experiments are an important and interesting part of the convention proceedings, and many ideas are advanced which, while devised for use by electric railways, are as readily adaptable to steam railway practice. Furthermore, an exhibit of equipment is a feature of the convention, including a display of motor coaches and related equipment which is the largest and most comprehensive of its kind. The convention will be held this year, as during the past two years, at Cleveland, Ohio. It will begin on September 22 and last until September 28.

The Extent and Effect of Motor Truck Competition

VERY little comprehensive information has ever been made public on the actual extent and effect of competition for freight by motor trucking companies. The extent of the losses of passenger traffic, whether to private automobiles or to common carrier motor coaches is a well-known matter of record. But the exact kind and amount of freight which has been won away from the railway train by the motor truck is still a matter of conjecture rather than of knowledge. Certain local facts are known, such as the decrease in line stock shipments in certain localities, or the loss of substantial amounts of milk or other commodities at different places. A picture of the situation on a nationwide scale, however, has never been made, to our knowledge. The Interstate Commerce Commission report on its motor coach and truck investigation, while the nearest approximation to such a picture, is admittedly lacking in many respects. One of the proposals at the last meeting of the Motor Transport Division was that the regional committees in the motor truck section should investigate and report as soon as possible just how much freight traffic had been taken from the railways by motor trucks in their localities. It is hoped that these committees will be able to go into this thoroughly before the next meeting is held. A report on it would be worth studying and would probably contain much data of a surprising nature.

The Appearance of Your Equipment

THE fact that the railways operating motor coaches over routes in competition with independent coach companies are usually able to attract most of the traffic is due in no small measure to the appearance of their equipment. It is a notable fact that railway motor coaches are uniformly better looking than those of their independent competitors. The difference in favor of the railway equipment is particularly striking when motor coaches operated by several companies, including one or more railways, are lined up together at a terminal. A motor coach that is clean and well-painted, inside and out, is one of the most effective traffic solicitors that an operator can possess. A clean motor coach, lacking the scraped and dented sides and twisted fenders so common to the equipment of the so-called "fly-by-night" operators, is visible evidence to passengers that they can expect a safe, comfortable journey in it. It should be recognized, however, that as small independent motor coach companies are consolidated into large systems—an important current trend—greater care in keeping up the appearance of the equipment is usually exercised, so that it is probable that much of the advantages of the railways in attracting traffic by operating clean equipment will disappear. When motor coach transportation becomes more stabilized, clean equipment will be the rule instead of the exception. Even then, however, and particularly now, clean, attractive motor coaches are a traffic-building asset which no railway operator can afford to be without.

Reports for the Motor Transport Convention

OVER half of the time between the June and October meetings of the Motor Transport Division has elapsed. Less than two months remain in which to prepare the reports of the committees on the subjects assigned to them. The reports presented at the June meeting in Atlantic City, while generally interesting and instructive, suffered in most cases as a result of the extremely short time available in which to make them complete, and also because of the fact that most of the committees were not even appointed prior to the meeting. The committees are now fully organized, however, and are in a position to go ahead vigorously with the division's program. The purposes of the Motor Transport Division are fully as important as those of any other division. It is its duty to show the railways how they can meet and overcome the problems which have grown out of the development of motor transportation. Whether or not the division accomplishes its purposes depends almost solely upon its committees. Railway executives are watching the division closely, particularly at this time when it is new.

Each committee should realize the responsibility that has been placed upon it, and should lose no time in getting into its stride. It is no easy matter to prepare constructive reports on so new and involved a subject as motor transport and its relation to the railways. But conscientious work, in the time available, will accomplish this. The next two months should see each Motor Transport Division committee bending every effort to complete good reports for the October meeting.

The Boston & Maine Coach and Train Tours Successful

REPORTS from Boston indicate that the Boston & Maine all-expense motor coach and train tours in New England are attracting a heavy business. The success of the operation has already been proved, in spite of the fact that it began as recently as early July. The plan of operation of the tours is particularly ingenious. In all, 18 tours, lasting for various lengths of time, are offered. All of them are built around one tour, the longest, taking tourists to virtually all of the points of scenic and historic interest in Boston & Maine territory. By enabling passengers to connect with the principal tour at any of several points along its route, going from Boston directly by motor coach or train, seventeen other optional tours are made available. Furthermore, by co-ordinating the tours schedules with the schedules of regular motor coaches and trains, it has been possible to offer the new service with the addition of comparatively few special tour motor coaches, and the increase in motor coach miles operated, over those covered by the regular coaches, is small. Many opportunities exist in the United States for the operation of motor coach tours by the railways and co-ordinating them with their train schedules. The experience of such roads as the Santa Fe, with its motor coach tours in New Mexico, the Union Pacific with its tours in Utah and Arizona, and now the Boston & Maine in New England, indicates, moreover, that such tours can be operated profitably, not only on the basis of the motor coach operations themselves, but also to the extent that they attract new business to the railways thus opening new territory attractive to tourists.

Report on St. Louis Trucking Investigation Is Encouraging

THE proposed report of Examiner Ames on the Interstate Commerce Commission's investigation of arrangements for the handling of l.c.l. freight by tractor and trailer in the St. Louis and East St. Louis terminal, entirely aside from its general approval of the railways' proposals, constitutes a strong argument for the kind of terminal l.c.l. service made possible by the operation of motor equipment. The examiner gives his approval to the proposal of the railways that one transfer company, the Columbia Terminals Company, be granted the sole right to operate off-track freight stations for them, and to handle by tractor and trailer all freight moving between these off-track stations and the on-track stations of the railways, as well as between the railways' on-track stations. He also approves the proposed reduction of the number of off-track stations. Further, he expresses strong favor for the designation of a constructive station at the west end of the Eads Bridge, declaring it to be an aid to the

direct delivery and receipt of freight. Examiner Ames criticises some of the practices in connection with the payment of allowances for transfer service, however, and recommends that the record be held open pending the making of a cost study and the preparation of new tariffs based upon its findings. Examiner Ames' proposed report is more than a tacit recognition of the value to the railways and to shippers of the operation of motor equipment in terminal service. While the physical characteristics of the St. Louis and East St. Louis terminals are particularly adapted to motor service, the benefits that Examiner Ames finds in the tractor and trailer operations there are such as those to be found in many other terminals throughout the country. If the Interstate Commerce Commission accepts the proposed report, not only will efficiency in the handling of l.c.l. freight in St. Louis be increased, but in all probability an impetus will be given to the use of tractors and trailers by the railways in other terminals.

Motor Transport Officers Have a Grave Responsibility

NO railroad man can view the continued loss of business to highway carriers with equanimity. This, of course, applies particularly to passenger traffic where the inroads are most serious, but the losses of freight business also are not inconsiderable. Some of the problems arising from this condition are discussed in an article by Ralph Budd, president of the Great Northern, elsewhere in this issue.

It is not enough to state that: "Passenger business is being lost largely to private automobiles." It is the truth, but not the whole truth. This observation must be supplemented with the acknowledgement that, in spite of the increase in private automobiles, motor coaches are able to increase their volume of business each year, whereas railroad passenger traffic declines. The motor coach seems to be a better agency with which to meet the competition of the private automobile than is the train. Perhaps some railroads do not regard the loss of passenger business as particularly serious. To others, however, it may be most important, and to such companies, it would seem, the adoption of the motor coach is almost imperative. One road which controls a large fleet of motor coaches is now enjoying, in coaches and trains, a combined volume of passenger business about as great as its peak rail traffic of five or six years ago. We doubt whether many roads which do not provide motor coach service can show any such result from train service alone.

The advent of the railways one hundred years ago did not put the waterways out of business, but the railways did with their greater flexibility soon become relatively the more important transportation medium. They will undoubtedly remain so as far as freight service is concerned, but who can be sure just what is going to happen as regards passenger traffic? Certainly the motor coach shows a virility in its increasing business which no transportation company interested in maintaining its earnings from passenger service can safely ignore. Railroad officers charged with the study and operation of highway service have today a great responsibility on their shoulders—that of pointing the way for the railways to meet the changing conditions in transportation.



Franconia Notch, White Mountains, on the B. & M. Tours

Boston & Maine Operates Coach and Train Tours

Series of 18 tours on all-expense basis include highway, train and boat travel—Little increase in coach miles

By R. J. Littlefield*

Manager Boston and Maine Tours

A COMPARATIVELY recent development of vacation travel is the motor coach tour, personally conducted, and with all expenses covered at the start with one payment. This method of viewing

* Mr. Littlefield is also manager motor coach service, Boston & Maine Transportation Co.



Tour Coach Leaving a Stopping Point in the White Mountains

the historic and scenic spots of New England has become so popular that in the summer of 1927 there were four tourist companies in Boston & Maine territory operating approximately 110,400 coach miles during an eight-week season, with estimated revenues for transportation of \$73,000.

Recognizing that this method of tourist travel is growing and that the railway would lose an increasing amount of transportation to scenic resorts, the Boston & Maine Transportation Company is offering this summer a series of 18 all-expenses tours combining motor coach, rail and steamer trips, covering vacation resorts in Massachusetts, New Hampshire, Maine and Vermont, in its territory. These tours are from one to seven days in duration, cover from 275 to 600 miles, and range in price from \$14.75 to \$72.50, this price including transportation and charges for meals and lodging at leading hotels. In view of the fact that we are operating a regular scheduled motor coach service between Boston, Mass., and Portland, Me., and two routes between Boston and the White mountains of New Hampshire, we are enabled to offer a variety of tours

with a minimum addition to our motor coach mileage for exclusive tour service.

Tour No. 1 Basis of Others

Our principal tour, No. 1, is a four-day personally conducted Motor Coach trip from Boston along the New Hampshire and Maine beaches to Portland, where an opportunity is given for a steamer ride through Casco

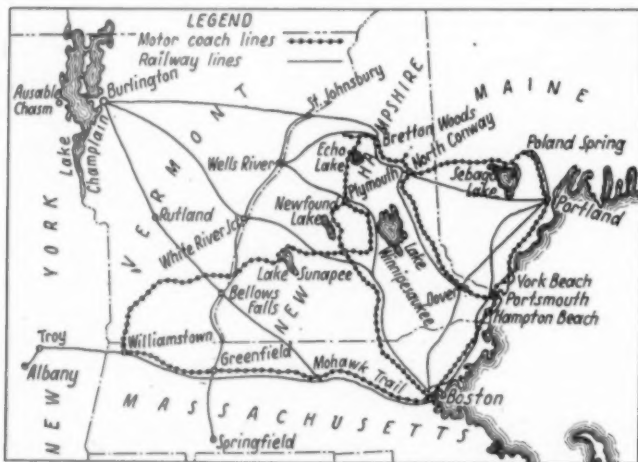


Tourists Leaving a Coach to See the Flume

Bay; thence through the Crawford and Franconia Notches in the White mountains, by Newfound lake and Lake Sunapee in New Hampshire to Manchester, Vt., returning to Boston through the Green mountains of Southern Vermont and over the Mohawk trail from North Adams, Mass. The first night is spent at Portland, the second at Bretton Woods, N. H., and the third at Manchester, Vt.

Eighteen trips will be made over this route between July 3 and Sept. 14. This 600-mile tour and a weekly trip from Portland to Bretton Woods, and return (266 miles) will be covered by motor coaches assigned exclusively to the tour service. The total of exclusively tour mileage amounts to 12,700 coach miles for the season.

By combining parts of this main tour with our regu-



Motor Coach Tour Routes and Boston & Maine Rail Lines

lar motor coach service and Boston & Maine rail service, the Boston & Maine Transportation Company has arranged a group of tours selected to suit the various individual requirements of the summer tourist.

Tour No. 1 leaves Boston every Tuesday and Friday

during the height of the season. Our regular scheduled motor coach service to the White mountains leaves Boston on Mondays, Wednesdays and Saturdays, going via North Conway, N. H., and the Crawford Notch, returning the following day via Franconia Notch and Lake Winnepesaukee. The White mountains motor coaches also leave Boston on Sundays, Tuesdays, Thursdays and Fridays, going via Lake Winnepesaukee and the Franconia Notch, returning the following day via the Crawford Notch and North Conway. This provides regular motor coach service between Boston and the White mountains in both directions on the two main routes.

The Boston & Maine Transportation Company also operates four trips daily in each direction between Boston and Portland. The main tour is so arranged that it ties in with the regular coach service and Boston & Maine rail service at Portland, North Conway, Bretton Woods, Plymouth, North Woodstock, Franklin, N. H. and Williamstown, Mass. By using this regular service, it is possible to leave Boston the day following the departure of Tour No. 1 and travel to Bretton Woods by motor coach or train and then continue with Tour No. 1. Another option is to leave Boston the second day after departure of Tour No. 1 and join the tour at Plymouth, N. H., or Franklin, according



B. & M. Coach Tourists at Echo Lake

to the method of travel from Boston, i. e., rail or motor coach. Tourists can also leave Tour No. 1 at Bretton Woods, make a trip to the summit of Mt. Washington on the cog railway (operated by the Boston & Maine) and return to Boston by motor coach or train.

The foregoing are only a few instances of the co-ordination of our regular motor coach and train service with the tour service, which makes possible the arrangement of a variety of tours with very little additional mileage for exclusively tour service, compared with the territory covered.

Connections with Other Railways

The Boston & Maine motor coach and rail tours also include train service of the Maine Central, the Rutland and the Central Vermont in some of the options offered. The ticket for each tour contains coupons covering all expenses for transportation, including a seat in a parlor car where trains are used, hotel accommodations and admission fees.

New equipment has been purchased for this tour service, consisting of the latest parlor-type Yellow coaches with balloon tires. A tour conductor accompanies the principal tours to see that nothing is left undone for the comfort and convenience of patrons.

per cent. Tickets of the railways and the coach company are not interchangeable, and at no points are the same stations used. The only evidence of the interrelationship of the Motorway and the D. & R. G. W. lies in the handling of the accounting of the motor coach operations by the auditing department of the railway, for which a charge is made to the coach company.

At Denver, the Motorway leases space in the motor coach station of the Denver & Interurban Motor Company, a subsidiary of the Colorado & Southern, as a

sales and collections on the Driver's Trip Report, which is reproduced herewith. This is in the form of an envelope, with dimensions of 3½ in. by 6½ in., which contains the cash and tickets turned in. On the face of the envelope are spaces in which the driver writes the trip and coach numbers, the starting and destination points and the times of starting and arrival, information regarding each cash fare collected, the total number of cash tickets sold, the total number of tickets collected, the total number of passengers carried, speedometer readings, the amount of gasoline and oil consumed, the length of time on duty, the date and the driver's signature. A separate report is made out for each motor coach if more than one is used by the driver.

The driver also fills out a remittance slip, in duplicate, which is enclosed with the cash turned in in the trip report envelope at the end of each day. This form, which is a pink slip with dimensions of 2¼ in. by 6¼ in., is also reproduced herewith. The station agents to whom remittances are delivered, stamp both the original and duplicate of the remittance slip with the station dater, sending the original to the auditor with the daily reports and returning the duplicate to the driver, who encloses this with his daily report. Each Motorway driver collects and turns in about \$2,000 annually in cash fares.

Equipment and Operating Plan

The Denver-Colorado Springs-Pueblo Motorway owns and operates a total of six motor coaches, of which only three are in regular daily use during the winter when schedules are reduced and overflow loads are not encountered. In winter the coaches cover approximately 626 miles per day, in summer, 952 miles per day, on account of more frequent schedules, special parties and overflow trips. The equipment comprises four Mack Model AB four-cylinder parlor type motor coaches, seating 25 passengers each, and two Mack Model AL, six-cylinder, parlor type coaches seating 28 passengers each. The six-cylinder equipment was purchased last year, the other coaches being purchased in May, 1925, nearly three years ago. It is expected that the present equipment will handle the traffic satisfactorily for another year at least, without the purchase of additional units. The coaches are of the conventional parlor type design, with some changes in the engines to provide efficient operation in the high altitude of the Denver-Pueblo route. The coaches are painted with grey Duco enamel on the lower part of the body below the molding, and black enamel on the upper section of the body and the roof.

Three drivers are regularly employed by the Motorway in winter, with one extra driver in reserve who is paid only for the mileage which he covers. The regular drivers are also paid on a mileage basis, receiving three cents per mile. The equipment of the company is divided between the three principal towns served, three coaches being stored at Denver, two at Pueblo and one at Colorado Springs. The first duty of a driver in the morning is to go to the garage and drive the coach to the station. At the station he registers his name, the date, the number of the trip and coach and the time departed on the Driver's Register, kept at the station. After completing his trip, he registers out, showing arrival time, number of minutes late, if any, and the cause of the delay. Separate records are kept on this register of northbound trips and southbound trips. Having completed their day's runs and turned in their ticket and remittance reports, the drivers return their coaches to the garages.

Form 104—2M—10-27

Denver Colorado Springs Pueblo Motor Way, Inc.

DRIVER'S REMITTANCE SLIP—Original

TO TICKET AGENT:

Place amount enclosed to my credit with Treasurer, covering collections as follows:

Date 192.....

..... Driver

TRIP No.	DOLLARS			CENTS

TOTAL				

INSTRUCTIONS

Drivers must turn in their cash collections at end of each day, enclosing this form with cash in regular remittance envelope.

Agents will stamp both original and duplicate with station dater; enclose original to Auditor with daily reports and return duplicate to driver, who will enclose same with his report. Use carbon sheet that duplicate may bear same record as original.

Remittance Slip On Which Drivers Make a Record of Cash Fares Turned in to Agents

waiting room and ticket selling facility for its passengers. The company also pays a flat rental for station space at Pueblo, but prefers to arrange for station facilities in stores, shops, hotels and restaurants, paying the proprietors on a commission basis. Such arrangements are in effect at all regular stations except Denver and Pueblo.

Handling of Tickets

Most of the passengers of the Motorway buy their tickets at stations where they begin their journeys, but a considerable number pay cash fares to the coach drivers. The drivers are supplied with cash fare books of tickets for this purpose. The drivers turn in daily a record of cash fares collected as well as of station-sold tickets taken up. They show a record of ticket

On the winter schedule of the Motorway, one coach leaves Denver at 8:00 a.m., arrives at Pueblo at 12:00 noon, leaves Pueblo at 2:15 p.m., and arrives at Denver at 6:30 p.m. The driver who operates this coach thus make a daily mileage of 238 miles. Another coach leaves Colorado Springs at 8:00 a.m., arrives at Denver at 10:30 a.m., leaves Denver at 1:00 p.m., and goes through to Pueblo where it arrives at 5:30 p.m., and ties up for the night. Another coach leaves Pueblo at 10:30 a.m., arrives at Denver at 3:15 p.m., leaves Denver at 6:00 p.m., and goes only as far as Colorado Springs where it is stored for the night. Two coaches and drivers thus alternate on the two last schedules, remaining one night at Pueblo and the next at Colorado Springs, or vice versa. Since they are single men, they maintain only one room as sleeping quarters at each city, taking turns in their use. These rooms and all other personal expenses are paid for by the drivers themselves.

Maintenance Methods

The cost of maintaining the Motorway's coaches last year was 2.41 cents per mile, this cost including all charges except those for oiling and cleaning. The lubricating cost and the cost of chassis and gear grease and motor oil aggregated 0.22 cents per mile. Only two men are employed to maintain the six coaches, these being located at Denver where storage and repair space for four coaches is rented from a public garage. At Pueblo and Colorado Springs, space is rented only for storing the idle coaches. One mechanic handles all the maintenance work in connection with the operation and he also takes care of the painting of the coaches. An assistant takes care of the cleaning and oiling of the equipment and assists the mechanic when necessary. The frequency with which the coaches are washed depends largely upon the weather; if the roads are dry and not dusty, the coaches are not washed every day. Windows, however, are washed inside and out daily.

The company depends largely upon the factory branch of the Mack company for parts needed in the repair of the equipment. It also expects to have this factory branch handle any especially heavy maintenance work for which special tools are required, since the Motorway has so little of such work to do that investment in the special tools would not be worth while. Very few spare parts are kept in the Motorway garage, those kept in stock comprising only spring shackle bolts, connecting rods, drive shafts, magnetos and similar parts.

In addition to his own kit of hand tools, the mechanic has a pressure grease gun, a set of inside and outside micrometers, a paint gun, valve reseaters, special cylinder head wrenches, and an electric drill.

Careful Watching Prevents Failures

The policy of the company is to hold down repair costs by watching every item and to prevent failures instead of making repairs after failures. It also lays emphasis on the requirement that repairs shall be efficiently and properly made. The drivers report to the mechanic evidences appearing on the road of faulty parts, either verbally or in writing if they come in off the road after the departure of the mechanic at night. A record of repairs and overhauling of major parts is kept but such parts are not overhauled on a mileage basis. Rather, they are let alone as long as they function properly and there are no indications of early failure. The company has had an excellent record in-

sofar as road failures are concerned, these having been very few.

Traffic Development

The Motorway employs no traffic solicitors, taking only the business which comes to it. Special party business is catered to, and this has been found profitable,

FORM 109			
Denver, Colorado Springs, Pueblo Motor Way, Inc.			
DRIVER'S TRIP REPORT			
TRIP NO. _____		CAR NO. _____	
FROM _____		A. M. P. M.	
TO _____		A. M. P. M.	
REPORT OF CASH FARES COLLECTED			
RECEIPT NO.	FROM	TO	AMOUNT
TOTAL - - - -			
NO. CASH FARES SOLD - - - -			
NO. TICKETS COLLECTED - - - -			
TOTAL PASSENGERS - - - -			
SPEEDOMETER READING			
FINISH _____		GASOLINE, GALS. _____	
START _____		OIL, PTS. - - - -	
MILEAGE _____		TIME ON DUTY _____	
DATE _____		DRIVER _____	
MAKE OUT SEPARATE REPORT FOR EACH CAR USED			

Driver's Trip Report

It spent 1.7 per cent of its gross revenue for advertising last year. Included in advertising are the time-cards issued in addition to newspaper space contracted for.

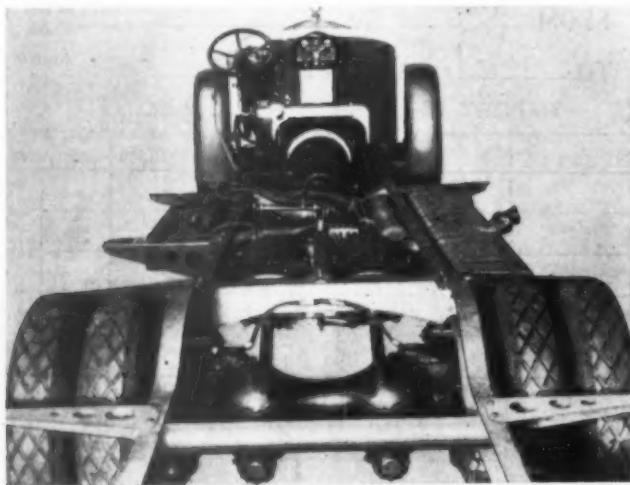
Newspaper advertisements are run when schedules are changed. The Motorway also buys space in the annual publications of schools and organizations from which it receives special party traffic.

In carrying baggage, a maximum of 25 lbs. is carried free of charge. Excess baggage is charged for on the basis of one-half the quoted passenger fare per hundred pounds, the minimum collection being \$0.25. No single pieces of baggage weighing over 150 lbs. are carried. Dogs are carried on the same basis as excess baggage.

The White Gas-Electric Motor Coach

A GAS-ELECTRIC motor coach powered by a White six-cylinder 100-hp. motor fitted into a new chassis designed for gas-electric service, has been placed on the market by the White Motor Company, Cleveland, Ohio.

The chassis has been designed as a complete unit, thus making it possible to mount the bodies without any alterations to the chassis wiring. In addition, attention has been given to the mounting of the motors and the generator so that the work of removing any unit is made a simple operation. The chassis layout is simple



General View of the Chassis of the White Gas-Electric Motor Coach

and clean and considerable attention has been given to accessibility from a service standpoint.

The generator is driven by a flexible steel shaft, which runs through the generator to the commutator end, the drive being taken through rubber ball joints. The two motors are connected to the underslung worm-driven rear axle by short universal-joint shafts, and



The Generator Mounting and the Hand Controller with the Cover Removed

the shaft brakes are mounted directly on the rear end of the motors, these forming a part of the motor design. In every respect, care has been exercised to insure a rigid construction throughout without excess weight. The chassis weight, complete with all equipment and a

spare wheel and tire, is 11,500 lb. The wheel base of the chassis is 227 in., the front axle tread, 66¼ in., and the rear tread 75¾ in. The over-all width at the rear axle is 95 in. and the rear width of the frame is 49 in. The overall length over the bumpers is 358 in.

The bore and stroke of the engine are 4¾ in. and 5¾ in., respectively, which gives a piston displacement of 519 cu. in. The motor is provided with a seven-bearing crankshaft and camshaft. The air compressor is mounted integral with the engine. Force feed lubrication is furnished to all of the main connecting rods, the camshaft, the air compressor, accessory drive and the chain idler bearings. Direct lubrication is provided to the overhead valve mechanism. The special oil cleaning system is integral with the crankcase.

A General Electric generator, which is mounted on a special sub-frame with three-point suspension, is coupled directly to the engine with G.E. type coupling. The generator will run at from 400 to 800 r.p.m. at from 200 to 240 volts and from 450 to 600 amperes.

The two General Electric series-wound motors are spring mounted on three-point suspensions and coupled



The White Gas-Electric Motor Coach for Interurban Service

by tubular propeller shafts with all-metal oil-lubricated universal joints to the rear axle. They operate on 250 volts, 210 amperes and at 2,000 r.p.m. The General Electric controller contains positions for series and parallel, neutral, brake and reverse. Provisions are provided for engine testing with the controller in neutral position. Variation in speed and power is secured through the engine foot throttle.

The frame consists of a pressed-steel, heat-treated, deep channel section with large diameter cross members. The dimensions of the frame section are 10½ in. by 3½ in. by 5/16 in.

The service brakes are of the internally expanding type, operated by air pressure. The air pressure is obtained from a 6-cu. ft. Westinghouse air compressor built into the engine. In addition to the usual type of mechanical emergency brakes, an electric emergency brake of the regenerative type is provided, which is operated by the controller. The tires are 36-in. by 8-in. high pressure cords all around. Dual wheels are used at the rear. Disk wheels are standard equipment.

Power Brakes for Automobiles*

*Development obtained during the past year assures
safe control under all conditions with
practically no physical effort*

By H. D. Hukill

Manager Automotive Brake Division, Westinghouse Air Brake Company, Wilmerding, Pa.

THE automotive industry has long concerned itself with the development of methods and appliances to make motor car driving safe. Four-wheel brakes were a significant step in this direction in that they distributed available pedal pressure over all four wheels, but the force available to operate the brakes on all four wheels remained the same as before, viz., muscular effort of the driver.

If the greater retarding effect possible with mechanically-operated four-wheel brakes is to be fully realized, it is necessary to do one of three things, namely; increase the pedal pressure; increase the brake leverage, and consequently the pedal movement; or increase the "self-energizing" effect.

Obviously, increased pedal pressure is undesirable, but, if twice the braking result is to be had it will require twice as much effort to apply four-wheel brakes as two-wheel brakes.

To keep down the pedal pressure required to control a car, it has been necessary in many cases to increase the brake leverage to a point where the pedal movement is awkward and difficult, especially when the foot has to be lifted seven or eight inches from the accelerator to contact with the brake foot pedal.

In the effort to counteract this long pedal movement the practice of close fitting brake bands or expanding shoes has sometimes been resorted to, with the result that the slightest wear makes frequent adjustment necessary, and brake bands often burn out due to drum expansion.

Fundamental Characteristics of Present Practice vs. Power Braking

It is also sometimes necessary to take full advantage of the cumulative effect of the wrapping tendency to get sufficient retarding force. This is undesirable as it in-

* Abstract of a paper presented at the thirty fifth annual convention of the Air Brake Association, held at Detroit, Mich., May 1 to 4, 1928, inclusive.

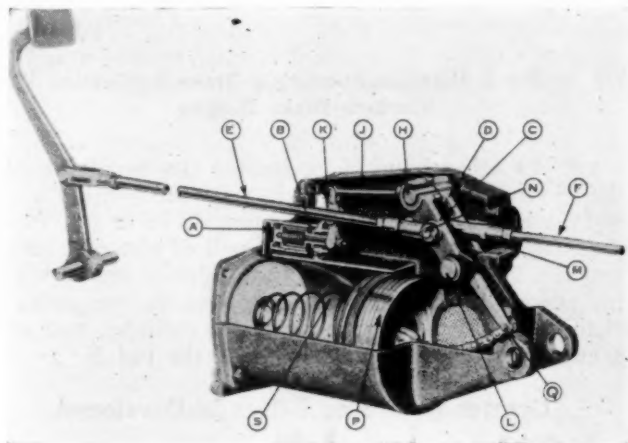


Fig. 1—Sectioned Model of a Vacuum Brake Unit in Release Position

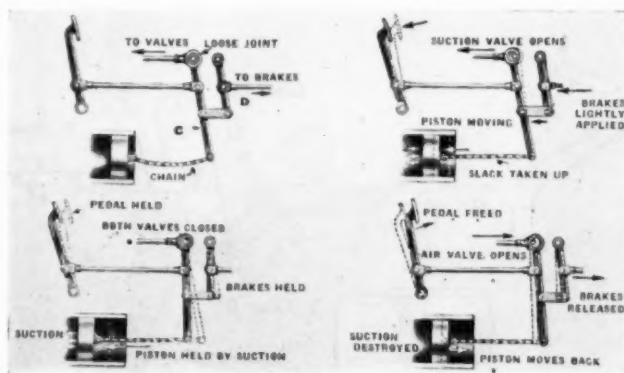


Fig. 2—Diagram Showing the Vacuum Brake Unit in its Various Positions

creases the possibility of grabbing, and decreases the brake efficiency for backward movement.

It seems appropriate to contrast at this point, the fundamental characteristics underlying present braking practices and the promise of power braking. A considerable activity now exists in search for whatever assistance may be attained from the use of "wrap-up" or "self-energizing" features which, for the most part require rather accurate adjustment and skilled maintenance to be and remain fully effective, at the same time also presenting a rather serious service problem to produce proper operation after field relining. The use of a power medium in brake control points at once to the possibility of simplifying the brake system such that its characteristics, once established, can be expected to remain uniformly effective throughout extended periods between adjustment, with correspondingly long life of linings. Vacuum brakes have already been very favorably received in Europe as evidenced by the fact that they have been adopted as factory equipment by some 65 European manufacturers.

Power Supplements Muscular Strength

The Westinghouse vacuum type brake is an amplifier, which provides power to supplement muscular strength. It assists the driver to apply the service brake, and thereby reduces the required pedal stroke and pedal pressure, without interfering in any way with the regular service brake hook-up. The pedal pressures, although but one-third that normally required, are sufficient to retain the "feel" of braking; a proportionate amount of pedal pressure with corresponding movement will give a proportionate amount of braking effect. This assures safe car control under all conditions, with practically no physical effort. So long as the driver maintains a certain pressure on the pedal, the braking force remains constant. As soon as he lessens pedal pressure the braking force becomes proportionately less, and as soon as he increases the pressure the braking force correspondingly increases.

Brake operation with such light pedal pressures

quickly becomes an act of unconscious judgment and imparts a new feeling of confidence in car control in traffic and on slippery streets, as well as removing practically the last really laborious factor existing in modern motor car operation.

The Brake Amplifier

The brake amplifier is a compact, self-contained device attached rigidly to the chassis between the brake pedal and the standard brake mechanism. The unit can be installed on many cars by simply cutting the rod

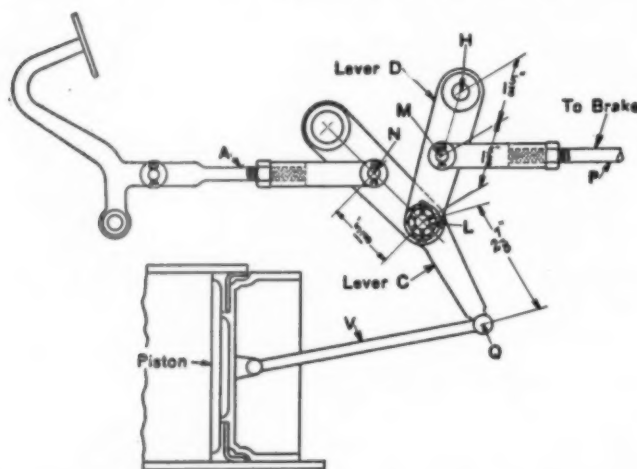


Fig. 3—Diagram Showing the Proportions of Vacuum Brake Linkage

connecting the brake pedal to the first equalizer or cross shaft and inserting the device, restoring the connection of the cut rod to the brake unit by means of two yokes. As an amplifier for hydraulic systems the leverage system of the brake unit is reversed and the force transmitted to the master cylinder by pushing through the amplifier, with the short brake rods in compression. The original braking system is left intact, so that the brakes may at all times be applied by the physical force of the operator with or without the assistance of the amplifier. Should the vacuum fail for any reason, the brakes may be applied by foot pressure alone without any added resistance from the vacuum unit.

The brake unit comprises an operating piston, a simple valve mechanism, and an ingenious leverage system. The double-acting operating valve of the unit includes a vacuum connection, also an atmospheric port to the main housing so that though the valve action air may be exhausted from the cylinder proper, or it may be ported to atmosphere. The housing is fitted with a breather and suitable curled hair strainer, to prevent the admission of road dirt, splash, etc.

Referring to Fig. 1 it will be seen that from the regular pedal a rod *E* extends to a double-arm lever *C* which has a floating fulcrum at *L* on the single-arm lever *D*, which is in turn fulcrumed on pin *H* in the upper part of the housing. Lever *C* is formed with an eye at its upper end which surrounds the pin *H*, and this eye is of somewhat larger diameter than the pin itself, which gives lever *C* a certain freedom of motion around the floating fulcrum *L*. From the eye of lever *C* a rod *J* connects through rocker arm *K* to the two poppet valves *A* and *B*.

If the driver presses lightly on the pedal the effect will be to rock lever *C* left-handedly around the floating fulcrum *L*. Rod *J* will then be moved toward the left, the direction of motion being changed by the rocker

arm *K*, and the application valve *A* will be moved from its seat, thereby connecting the source of vacuum with the power cylinder *S*. The result of this is that the piston *P* in the cylinder is forced to the left by the atmospheric pressure against its outer side. A very interesting leverage action now occurs.

Let us first explain the action which takes place when the vacuum cylinder is entirely disconnected from the source of vacuum. The pull exerted on the rod *E* by the pressure of the driver's foot would then be transmitted from lever *C* to lever *D* by way of floating fulcrum *L*, and thence to rod *F*. Since rod *F* is in line with rod *E* the motion of both rods will be the same and there will, therefore, be no change in the pull; in other words, the pull on rod *E* produced by pressing on the pedal will in that case be transmitted without modification to the brake rod *F*.

On the other hand when the piston in the vacuum cylinder pulls on its chain the lever *C* acts as a balance or equalizing lever, having vacuum pressure acting at *Q* with pedal pressure at *N*. These forces combine at the fulcrum *L* and are multiplied through lever *D* to give an augmented pull on rod *F*. What this multiplication is will be explained in detail later.

When the driver first depresses the pedal, lever *C* will rock left-handedly around its floating fulcrum *L*, whereby the valve rod *J* is moved to the left and the application valve *A* opened, as already explained. However, as soon as the piston begins to pull on the lower end of lever *C*, the latter tends to return to its original position by rocking right-handedly about the pedal rod connection *N*. The exact action which then takes place depends upon how hard the driver presses on the pedal. If he exerts only a moderate degree of pressure, lever *C* may return to a central position, where the eye at its upper end is symmetrical with respect to pin *H*. In that case the application valve *A* closes and the pull of piston *P* thereby remains constant.

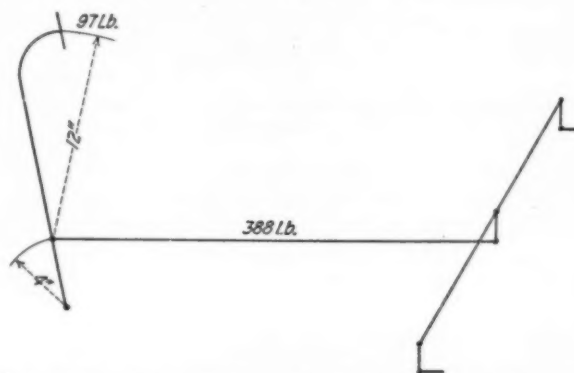


Fig. 4—Force Diagram Showing a Brake Application With Standard Brake Rigging

On the other hand if he lessens the pedal pressure the lever *C* will be rocked to its extreme position to the right, which results in the opening of valve *B*. Air is thus admitted to cylinder *S*, the pull of piston *P* ceases, and the brakes release. Thus the driver has it within his power, by pressing more or less on the pedal, to change the degree of vacuum in the cylinder, and, consequently the pull applied to the brake rod *F*.

Greater Retarding Effect Is Developed

It will, moreover, be evident that the force actually applied to the brake drums is a combination of foot pedal pressure and power generated in the brake unit. A greater retarding effect can thereby be developed with

the customary pedal pressure, or the same retarding effect with much less pedal pressure, thus giving adequate control with greater ease. This instantaneous and automatic combination of pedal force and power amplification in normal operation is one of the prime essentials of a satisfactory power brake for passenger cars, in contrast to such systems as interpose an auxiliary control valve, the operation of which is not definitely an integral function of the power unit.

Foot and Vacuum Pressure

Fig. 2 shows a schematic arrangement of the brake amplifier in its various positions.

How the foot pressure on the pedal, and the vacuum pressure in the amplifier combine their forces to apply the brakes with much greater effectiveness than that possible by physical effort alone, will now be explained more in detail.

For the sake of simplicity, (referring again to Fig. 1), we will assume for the time being that the upper arm NL of lever C is one-half the length of the arm CL . Then to balance the pull of the vacuum piston, the driver would have to exert twice that pull on the rod E . The force on fulcrum L would be the sum of the pulls on rod E and on the piston chain, which is equivalent to one and one-half times the pedal rod pull. Then this pull is in turn multiplied through lever D which has a 2 to 1 ratio.

Hence for a given pull P on the pedal rod E , a pull $3P$ is exerted on brake rod F and this ratio is maintained throughout the range of pedal pressures up to the maximum capacity of the vacuum brake unit.

The unit illustrated has a piston $4\frac{1}{2}$ inches in diameter with linkage proportions as shown in Fig. 3, and other models of 5-in. and 6-in. diameters have substantially the same leverage ratios and produce a corresponding amplification. It is readily apparent also

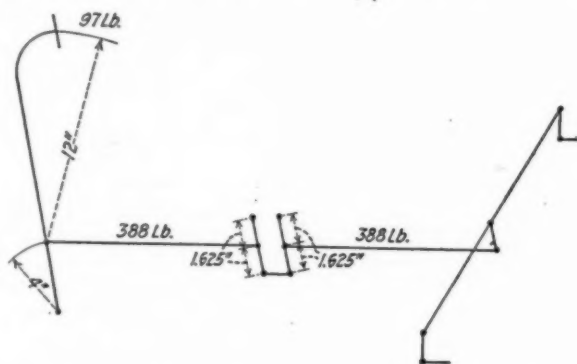


Fig. 5—Force Diagram Showing the Mechanical Brake Application Through Vacuum Brake Linkage

that any desired factor of amplification, or force multiplication may be produced.

Force Developed With Mechanically Operated and Power Brakes

Fig. 4 is a diagram showing the force developed on the brake rod with the ordinary rigging. Assuming a pedal leverage of 4 to 1 and a pedal pressure of 97 lb., a pull of 388 lb. is developed on the brake rod. Fig. 5 shows that the same force is developed through the vacuum brake linkage if an application is made mechanically without the aid of the amplifier.

Fig. 6 shows that with assistance from the vacuum amplifier a much less pedal pressure is required to produce the same force on the brake rod. This 388-lb.

pull on the brake rod is produced by 194 lb. on the floating fulcrum L of lever C acting through the 2 to 1 lever D . The components of this force of 194 lb. on the equalizing lever C are a pull of 70 lb. from the amplifier piston and 124 lb. pedal rod pull which is in turn produced by a pedal pressure of 31 lb., as contrasted with 97 lb. when the brakes are operated by physical effort alone.

If a greater braking force is now desired a higher pedal pressure will result in a correspondingly higher

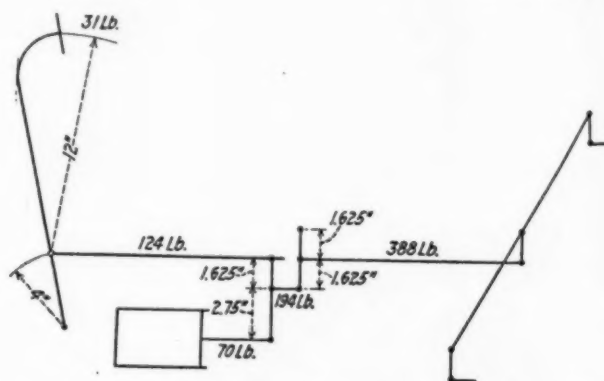


Fig. 6—Force Diagram Showing Reduced Pedal Pressure Required to Get an Application With the Vacuum Brake Amplifier

vacuum and a greater combined pull on the brake rod. But once the maximum capacity of the amplifier has been reached, any additional force will be obtained by mechanical force alone without further assistance from the amplifier. It should be emphasized, however, that in such cases the full effect of the amplifier is retained.

Capacity of Various Units

This brings us to a consideration of the capacity of the various vacuum brake units.

With a $4\frac{1}{2}$ -in. diameter piston, (area 15.9 sq. in.), assuming a pressure of $7\frac{1}{2}$ lb., (obtained with 15-in. vacuum at sea level), the total pull of the piston will be $15.904 \times 7.5 = 119.28$ lb. Then the pull on the pedal rod necessary to equalize 15-in. of vacuum will be 210 lb. Since this unit has a leverage ratio of 3.13, the pull on the brake rod F will be $210 \times 3.13 = 660$ lb. This unit has a maximum stroke of $1\frac{3}{4}$ inches.

With a 5 in. piston, (area 19.635 sq. in.) the total pull of the piston will be $19.635 \times 7.5 = 147.26$ lb. To equalize the pull of the vacuum piston the pedal pull must be 248 lb. This unit has a leverage ratio of 3.18. Therefore the total pull on the brake rod will be $248 \times 3.18 = 790$ lb. This unit has a maximum stroke of $1\frac{11}{16}$ inches.

With a piston 6 inches in diameter (area 28.2744 sq. in.) the total force on the piston is $28.2744 \times 7\frac{1}{2} = 212.058$ lb. The pedal rod pull necessary to balance this is 349 lb. The lever ratio in this larger unit is 3.43 which means that the force developed on the brake rod at the normal capacity of the unit is $349 \times 3.43 = 1197$ lb. This unit has a maximum stroke of $2\frac{1}{4}$ in.

EFFECTIVE AUGUST 19, the Union Pacific Stages, Inc., extended their Portland-Pendleton-Walla Walla service to Lewiston, Ida. The new schedule will bring into regular service another one of the Union Pacific's new 22-passenger de luxe coaches. The total mileage now to be operated by the Union Pacific Stages, Inc., will be 371.8 miles, of which 266 miles are in Oregon, 104 miles in Washington and the rest in Idaho.



Tractor and Trailer Used by the Columbia Terminals Company of St. Louis

I. C. C. Examiner Reports on St. Louis Trucking Investigation

Proposal of railways to employ Columbia Terminals Company for operation of off-track stations, and to maintain constructive station approved

THE PROPOSED report of Attorney-Examiner Harry C. Ames on the Interstate Commerce Commission's investigation of motor truck transfer of freight in St. Louis, Mo., and East St. Louis, Ill., and also of off-track station and construction station receipt and delivery of freight in those cities, is of interest to motor transport officers on account of its bearing upon what is one of the leading operations of the tractors and trailers in railway terminal service. The proposed report approves in a general way the proposal of the railways entering those cities, with the exception of the Chicago & Alton, to effect joint arrangements with the Columbia Terminals Company looking toward great efficiency in the handling of freight in those cities. The examiner recommended that the proposal of the carriers, excepting the Alton, to employ a single transfer company, the Columbia Terminals Company, for the operation of off-track stations and for the haulage between such stations and the on-track stations of the railways and in the interchange of freight between railways, should be found not violative of any provision of the Interstate Commerce Act.

He recommended further that the proposal of the same carriers, to reduce the number of off-track stations in St. Louis from 12 to 7 and in East St. Louis

from 3 to 2, should be found as not having been shown harmful to the public interest, as resulting in unreasonable and inadequate service, and that the present and proposed maintenance of a constructive station at the west end of Eads bridge, as an aid to the direct receipt and delivery of freight from and to shippers and consignees, be found not unlawful, and as at present operated, not resulting in unlawful practices. The proposed schedules of the railways, according to the proposed report of Examiner Ames, are not justified in their present form, however, and he recommends that the record should be held open in order to afford opportunity to the railways to enter into a cost study of the service considered and to prepare new tariffs and contracts in the light of such a study.

The Columbia Terminals Company is one of the largest operators of tractors and trailers under contract with the railways in the United States. For a number of years it has been receiving and delivering l.c.l. freight for the railways entering St. Louis and East St. Louis, either at off-track stations or through a so-called constructive station. Although it formerly made considerable use of horse-drawn drays, the Columbia Terminals Company is now completely motorized and operates a large fleet of up-to-date equipment. The company now has 107 tractors and 432 trailers in operation.

The St. Louis and East St. Louis terminal is considered the most completely motorized l.c.l. freight terminal in this country, due in large measure to its peculiar geographic situation. The Pennsylvania, the Baltimore & Ohio, the Big Four, the Southern, the Mobile & Ohio, the Illinois Central, the Chicago & Alton, the Nickel Plate, and the Litchfield & Madison have freight stations only on the east side of the Mississippi river. The Missouri-Kansas-Texas, the Rock Island, the Chicago & Eastern Illinois, the Illinois Traction System and the Frisco have stations only on the west side. The Wabash, the Burlington and the Louisville & Nashville, have freight stations on both sides of the river, in East St. Louis and St. Louis proper, and the Missouri Pacific and the St. Louis Southwestern have freight stations, in addition to those at St. Louis, at Dupon, Ill., three miles south of East St. Louis, on the east side of the river. Under the proposed contract, the Columbia Terminals Company, in addition to trucking freight between the off-track stations and the on-track stations of the railways, would also handle the transfer of all l.c.l. freight between their on-line stations in East St. Louis and St. Louis.

An abstract of the proposed report of Examiner Ames follows.

Proposed Report

The service consists primarily of the delivery and receipt of less-than-carload freight at East St. Louis and St. Louis. Partly because of physical obstacles, such as the Mississippi river and the topography of the St. Louis side thereof, and partly because of custom and usage, less-than-carload freight in the St. Louis-East St. Louis district is handled in a manner different from that obtaining at other points in the United States. Important lines, such as the Cleveland, Cincinnati, Chicago & St. Louis and the Baltimore & Ohio, have their termini in East St. Louis, but by their tariffs provide rates to and from St. Louis, on the same basis as applies to and from East St. Louis. They, therefore, hold themselves out to deliver at and ship from St. Louis and, not having their own rails, they must employ other means of performing the service between their rail ends and St. Louis. This service is performed in various ways.

Two methods of receiving and delivering less-than-carload freight through the medium of drays or trucks are employed, viz., through off-track stations maintained and operated by recognized transfer companies, and by the so-called direct-delivery plan under which the freight passes through a constructive station in its journey to and from the traders' places of business from and to the on-track freight stations in East St. Louis. Carload freight destined to St. Louis is ordinarily delivered from team tracks of the Terminal Railroad Association for the east-side lines, or from team tracks of individual west-side lines having such facilities in St. Louis, although some carload freight is handled by vehicles under the direct-delivery plan. No provision is made for the handling of carload traffic through off-track stations.

The railways do not propose to discontinue this service. They desire only to reduce the number of off-track stations now in operation, to enter into contractual arrangements for the haulage to and from and the operation of the stations to be kept open, and to constitute the Columbia Terminals Company their sole agent for this service. The Chicago & Alton, however, does not contemplate an exclusive contract with the Columbia. It also proposes to increase direct-delivery allowances to three cents on carload and five cents on less-than-carload freight, in contrast to similar allowances of one cent and two cents proposed by all other respondents.

The Proposed Contract

The form of contract proposed to be executed between the east-side lines, other than the Alton, on the one hand, and the Columbia on the other hand, is reproduced as an appendix to this report. In it the Columbia agrees, among other things, to provide and maintain, at its sole cost and expense, adequate off-track station facilities as therein designated; to maintain adequate forces and equipment for the prompt and efficient handling of freight between on-track stations, and between on-track and off-track stations; to load and unload such freight into or out of its equipment; to collect charges, observe embargoes and to act as the agent of the railroads in all respects as if the railroad were itself operating the off-track stations; to

assume responsibility for all freight while in its possession; to comply with the workmen's compensation laws of the states of Missouri and Illinois; to carry adequate insurance; to consolidate, discontinue, or abandon station facilities upon the written request of the committee of railroad representatives; to secure approval and consent of said committee before increasing facilities; and to furnish satisfactory bond guaranteeing the faithful performance of its contractual duties.

The railroads agree, among other things, to designate the off-track stations so provided by the Columbia company as the only off-track stations at which freight will be delivered or received; to deliver to the Columbia all less-than-carload freight for handling between on-line stations in East St. Louis and St. Louis; to make and continue to pay allowances for the various services as provided therein for the first 90 days the contract is in effect; to appoint a supervisory committee empowered to approve or reject changes in allowances and for the examination and inspection of books; and to give prompt consideration to any request of the Columbia looking to the increase or decrease of station facilities.

Services Proposed to be Discontinued

Some of the off-track stations in St. Louis are equipped for warehousing in the upper floors. For some years it has been the practice of certain eastern and southern lines to make an allowance of seven cents on carload traffic handled from team tracks in East St. Louis to off-track stations in St. Louis where the goods are put in storage. In order to meet this competition the west-side lines established an allowance of four cents from their team tracks in St. Louis to off-track stations in St. Louis. By this means shippers of sugar and rice, for example, are accorded what virtually amounts to storedoor delivery of carload traffic placed in storage, which should move to team tracks in St. Louis, or in lieu thereof, through the constructive station, and be handled to the warehouses at the consignee's expense. It is proposed to discontinue these allowances so that hereafter such consignees may elect whether to take delivery on the team tracks in St. Louis or avail themselves of the direct-delivery plan under which the transfer company will receive an allowance from the railroads for the movement to the constructive station at the west end of the Eads bridge and the balance of the draying charge from the consignee.

As a matter of law the carrier is obligated to make or tender delivery of carload freight at a public team track or at a private industry track. The only other alternative at St. Louis is the delivery through the constructive station. Any practice of acceding service in addition to this, such as that entailed in the movement of carload freight from recognized team tracks in East St. Louis or St. Louis to warehouses located above off-track stations, is gratuitous, has no warrant in fact or in law, is open to serious abuse by way of discriminations, comes perilously near to being an unlawful concession to those receivers who thus avoid an expense of drayage rightfully to be borne by them, and should be discontinued immediately.

Under the proposed tariffs the Missouri Pacific and the Frisco, with one exception, will discontinue the use of off-track stations, both on the south side and the north side of St. Louis and will require hereafter the use of their on-track facilities for the receipt and delivery of less-than-carload freight. To offset any competitive disadvantage which these lines might suffer by reason of this step, the other west-side lines having on-track facilities on the north side of St. Louis are to discontinue the use of off-track stations in that locality and confine their use of off-track stations to those located on the south side. The result may be outlined in the following general way: (1) The east-side lines having no station facilities in St. Louis will use off-track stations on both the north side and south side of that city; (2) the west-side lines having on-track stations on both the north side and south side of St. Louis will use no off-track stations in St. Louis; (3) the west-side lines having on-track stations only on the north side of St. Louis will confine their use of off-track stations to those located on the south side; (4) the west-side lines only will use the two designated off-track stations in East St. Louis. By these arrangements respondents will avoid payment for transfer service between off-track and on-track stations located near or adjacent to each other.

One-Transfer Plan

Probably the most bitterly protested of the respondents' proposals is that which provides for the employment of a single transfer company in the collection, distribution, and interchange of railroad freight, except that handled through the constructive station. The record contains a mass of testimony concerning this phase of the case, the gist of which on protestants' side is that, with competition among transfer companies eliminated,

the service will suffer, and that the selected company, through the monopoly thus conferred, will be in position to underbid other drayage companies in respect of service to and from off-track stations from and to traders' places of business, with the result that it will drive other companies from the field and have both the shippers and the carriers at its mercy. Respondents contend that the selected transfer company will act as their agent in the performance of services which they are legally bound to perform, and that they have the undoubted right not only to select their own agency but to limit their selection to one agency if they feel that economies in operation and no unreasonable curtailment of service will result.

There is no question that the proposal of respondents, other than the Alton, will result in conferring a virtual monopoly of railroad hauling, other than that performed in direct-delivery service, upon the Columbia. At common law respondents are within their rights in selecting a single and exclusive agent for the performance of this terminal transportation service.

The adequacy of the service under the proposed one-transfer plan cannot, of course, be tested by proved facts because the particular plan has never been operative. The record contains references to the unsatisfactory service of the old St. Louis Transfer Company during the period when it enjoyed a monopoly, but no proof that the monopoly, rather than inefficient and short-sighted management, was the cause of it. Even those witnesses who oppose the one-transfer plan concede that the Columbia is an efficient and well-equipped organization. It is completely motorized and has up-to-date equipment. Most, if not all, of its railroad hauling is done by the tractor and trailer method, affording the greatest possible flexibility in the matter of loading and unloading. These trailers are placed empty at on-track and off-track stations and when loading is completed a tractor is coupled on. The trailers are 8 ft. by 16 ft. or 18 ft., inside measurement, and 8 ft. in height. A ridge pole runs in the center from end to end and about one foot above the tops of the sides. In bad weather, or when necessary by reason of the nature of the freight, a canvas tarpaulin is spread over this ridge pole and around the load. The coupling and uncoupling of the tractors is done automatically and there is a drop-wheel arrangement on the tractors by means of which they retain their level when uncoupled. The Columbia has 430 trailers and 107 tractors in operation.

There is nothing in the so-called one-transfer plan in and of itself which violates any provision of the interstate commerce act. Nor can the commission make any finding upon this record that the service under this plan will be inadequate. Experience alone will answer that question, and if, at any time, the service becomes inadequate or is surrounded by practices which are unlawful, the shippers have recourse to the commission through the usual channels of complaint.

Off-Track Stations

Respondents contend that the four off-track stations selected to handle the outbound business have a capacity 29.6 per cent in excess of that which will be necessary for the business to be handled under their proposed plan. They arrive at this conclusion by the following method: In 1926, the total outbound tonnage handled by the three transfer companies then operating off-track stations in St. Louis was 1,079,734,461 lb., or an average of 3,528,544 lb. per working day. From this total they make the following deductions which they insist will accrue as a result of their proposal: A total of 8,635,473 lb. from discontinuance of the practice of allowing 7 cents and 4 cents on carload freight stored in warehouses of the transfer companies, as described; a total of 189,378,328 lb. as a result of the abandonment of off-track stations used by the Missouri Pacific and Frisco; a total of 11,857,320 lb. as a result of a similar abandonment by the north-side lines of off-track stations on the north side. This leaves a net total of 869,863,340 lb. to be handled at the four selected stations, or an average of 2,842,000 lb. per day.

These four stations, in 1926, handled a total of 663,551,950 lb., and they will have to increase this tonnage by 206,311,390 lb. to accommodate the total tonnage. The sum of the average per day handlings of these four stations is 2,173,000 lb., indicating a necessity of increasing the sum of those averages by 869,000 lb. The sum of the peak-day performances of the four selected stations, however, is 3,864,129 lb., or 842,129 lb. in excess of the new average daily requirements. Respondents measure the capacity of these stations by their peak day performances. In other words, the 29.6 per cent excess capacity is arrived at by dividing the excess, peak-day over average requirement, by the average requirement. They show also that 28 lb. per square foot of platform space was handled at these stations on the average day and 47.3 lb. per square foot on the peak days, indicating again an ample platform space.

In respect of inbound traffic, similar computations as to the three selected stations purport to show an excess capacity of 57.5 per cent, based on peak-day performances totaling 1,404,263 lb., as against an average per-day requirement under the proposed plan of 891,129 lb.

It is difficult to forecast the adequacy of the selected stations by mere mathematical calculations for the reason that so much depends upon the human element. But respondents' calculations do show that the selected stations in their normal operations handled in 1926 about 61 per cent of the normal outbound business and about 72 per cent of the normal inbound business. Computing the deductions made by respondents in the normal outbound business on the basis of 50 per cent of their expectations on less-than-carload traffic, and allowing full credit for the reductions to be realized in respect of carload traffic, the actual performance of the selected stations in 1926 was over 68 per cent and 82 per cent, respectively, of the anticipated outbound and inbound business. Discontinuance of some of these off-track stations will doubtless throw additional tonnage to the remaining facilities. It is also to be expected that the selected stations will be compelled to provide additional help and find additional means of accommodating the added tonnage. The total excess peak-day over average-day handling at the four selected outbound stations, was 1,511,129 lb., indicating a fair degree of flexibility in performance. As stated, the average daily performances of the four selected outbound stations in 1926 totaled 2,173,000 lb. Counting 306 working days in the year, and computing the anticipated tonnage in the manner last above indicated, it will be necessary for the selected stations to increase their total average daily handlings by 1,003,036 lb., or an average of slightly more than 250,000 lb. per station.

As stated, the performance of a freight station depends largely upon the personnel and efficiency of the platform crews. A witness for the Columbia, having charge of the operation of that company's off-track stations, testified that with sufficient men employed and sufficient empty trailers available for loads, there is hardly any limit to the capacity of an outbound station. He also expressed the view that fewer outbound stations would concentrate tonnage so that the transfer company would be able to dispatch bigger and more frequent loads to on-track stations. He bases this view on actual conditions at stations under his charge.

The largest outbound stations of his company are at Eleventh and Spruce streets and Second and Carr streets. These are so-called four-dump stations, that is to say, four different spaces are assigned to freight for groups of railroads. From July 1 to October 31, 1927, these stations delivered to the railroads 58 per cent and 53.4 per cent, respectively, of the freight received on the same day. At smaller off-track stations at Second and La Salle streets and Seventh and Cerre streets, one-dump stations, only 38.8 per cent and 36 per cent, respectively, of the freight received was delivered to the railroads the same day. At smaller stations it is often necessary to make combination loads for two or more railroads. Discontinuance of some off-track facilities will make crews now working there and motor equipment serving them available to the selected stations.

Upon the facts of record it cannot be said with any greater degree of certainty that the selected stations will not than that they will prove adequate. They are entitled to a fair trial and it is not to be assumed that the carriers will refrain from augmenting them if and when they fail to meet the reasonable demands of the shipping public. The carriers under their tariffs are bound to make deliveries of freight at St. Louis, and under the conditions now obtaining many deliveries must be made through off-track stations. These facilities they are bound to provide to a degree necessary reasonably and adequately to serve the shippers. However convenient it might be for shippers to have off-track stations dotting the city, they are not entitled as a matter of right to more stations than are necessary to meet their reasonable needs. Beyond that point the shippers would be receiving more than they have a lawful right to receive and the carriers would be wasting their revenues. It is also to be borne in mind that under a properly balanced scheme of allowances which will make direct-delivery service competitive in fact with off-track station service, much of the tonnage now moving in the latter will be diverted to the former and will tend to prevent or relieve any congestion which might at times occur.

Direct Delivery—Constructive Station

The practice of arranging for the so-called direct delivery of freight at St. Louis was originated in 1870 by the Louisville & Nashville, then exclusively an east-side line, in order to meet competition of the St. Louis, Iron Mountain & Southern, a west-side line. It gradually, for competitive reasons, spread to other east-side lines and covered additional origin territory until

it is now a universal practice. Under the arrangement any recognized trucking company, listed in the tariffs, receives freight at on-track stations in East St. Louis and hauls it to the consignees' places of business. From the moment the freight is received at East St. Louis until it passes a constructive point at the west end of the Eads bridge, the trucking company acts as the agent of the carrier. Thereafter it acts as the agent of the consignee. The constructive station is not a physical station. No stop is made there. No handling of the freight occurs. It is merely, as stated, a constructive line which divides carrier and consignee agency and responsibility. On outbound shipments the situation is the same in principle.

It will be seen, therefore, that the plan results in storedoor delivery and receipt in a modified form. The physical result is the same. It is modified only in that, instead of the carrier bearing the full haulage costs, they are divided at the constructive station.

Service Found Beneficial

There is no question that the service is beneficial and desirable. It benefits the shippers and receivers of freight because it saves, at St. Louis, an additional station handling and thus expedites movement. It benefits the carriers at St. Louis because it relieves them of payment for the additional station handling. If, for example, the 1926 inbound tonnage had all been handled in direct delivery instead of through off-track stations, the savings in allowances paid to transfer companies would have amounted to \$324,060.80. Similar savings on 1926 outbound tonnage would have been \$1,080,439.32. These computations are based on the difference between the present off-track station and direct-delivery allowances.

There are conditions which might make the constructive station plan improper and unlawful. Among these would be the practice of locating them so as to favor particular shippers. But where, as here, the station is located at the first and natural point of contact with the St. Louis side of the river; where the service is beneficial and desirable in the public interest; where its continuance is requested by municipal, carrier, and shipping interests; and where it will result in a saving to the carriers in the expense of delivery, there is no reason for condemning it because of vices which might exist but do not. The physical situation at St. Louis lends itself peculiarly to the constructive station plan. The constructive station used by all lines, being at the first point of contact with the St. Louis shore, is so located that by providing service to and from it the carriers are performing the minimum of the transportation service which they hold themselves out to perform, and yet are performing the full service to which they are lawfully obligated by their published tariffs. There is no attempt on their part, by groups or individually, to reach out with the constructive station, beyond their lawful obligations, for the purpose of securing tonnage, one from the other. A constructive station service operated purely as a convenient, expeditious and economical means of completing a contract of carriage merits approval. The same service, if operated solely as a competitive measure to secure business from a rival carrier more favorably located in respect of certain traffic, may become burdensome to the carriers and to commerce as a whole. No question is here presented as to the power of the commission to require the establishment of a constructive station against the wishes of the carriers. The service is here and the commission is asked only to approve or disapprove its continuance. The commission is thus dealing with a practical question which should be met in a practical way so as to cause as little disturbance as possible to existing conditions. Lack of direct control over a desirable plan should not condemn it when there is no contention or proof that unlawful or improper practices obtain. To find otherwise would be tantamount to saying that that over which the commission has no direct control is for that reason unlawful. If unlawful practices should develop at St. Louis or at other points, the commission could condemn the plan either on complaint or on investigation on its own motion.

Allowances

The next question to consider is the adequacy of the allowances proposed for this service. Respondents and protestants all express a desire for the views of the commission on this and other subjects here concerned, to the end of arriving at satisfactory terminal arrangements. Responsive to this desire this phase of the case will be discussed at length. As stated, the proposed allowances are 2 cents for less-than-carload traffic, and on fruits and vegetables in carloads, and 1 cent on other carload traffic, by respondents other than the Alton, and 5 cents and 3 cents, respectively, by the latter line. The theory of the respondents is that a direct-delivery allowance should be no more or no less than is necessary to equalize the disability of the east-side lines in not having on-track stations on the west

side. They place the constructive station in the same category as off-track and on-track stations in St. Louis, assume that between that point and places of business within St. Louis the drayage charges will be equalized, and allow just enough in addition to the equalized charge to compensate for the added length of haul between the constructive station and the on-track stations in East St. Louis.

At this point it should be stated that it is the general practice of St. Louis draymen to equalize their charges as between all on-track and off-track stations in St. Louis on the one hand and traders' places of business on the other hand. That is to say, the charge for a given class of merchandise from or to a place of business in St. Louis to or from any on-track or off-track station is the same, generally speaking. Whether this practice will continue in the event that the direct-delivery plan becomes a really potent factor cannot be ascertained.

Obviously, any direct-delivery allowance which would more than offset the disability of the east-side lines would result in a highly dangerous competitive situation. An allowance so high that it affords an opportunity for competing draymen to shade their charges to consignees, entirely aside from any question of legality, would have to be met by the west-side lines through establishment of similar allowances or through storedoor delivery. An allowance too low would not put the east-side lines on a competitive basis with west-side lines on traffic as to which shippers have an option as to service. All of the railroads sense the delicacy of this situation and all are anxious to reach a proper result. The Alton has proposed the increase in the allowances because it feels that the present allowances and those proposed by the other respondents are too low to attract tonnage to the plan.

The president of the Columbia, a man having 30 years' experience in the trucking business in St. Louis, testified that in his opinion the proposed two-cent allowance on less-than-carload traffic handled in direct delivery is adequate to equalize conditions, east side versus west side. The customary hourly rental for motor trucks in St. Louis is \$2.50. On the basis of a 10,000-lb. load, this witness makes the following calculations:

From east-side, on-track stations:	
Loading, one hour	\$2.50
Unloading, one hour	2.50
Road haul, 30 minutes	1.25
Bridge toll round trip	1.30
Total	\$7.50
10,000 lb. at 8 cents per 100—	
2 cents from railroad and 6 cents from consignee	\$8.00
From west-side, on-track or off-track stations:	
Loading, one hour	\$2.50
Unloading, one hour	2.50
Road haul, 20 minutes	.85
Total	\$5.85
10,000 lb. at 6 cents per 100	\$6.00

It will be observed that, under this method of calculation, the only extra expense attributed to the direct delivery is that for the 10-minute extra road haul, about 40 cents, plus \$1.30 for bridge tolls; a total of \$1.70. The allowance of 40 cents, or \$2 on a 10,000-lb. load, is 30 cents over those items. The witness explained that his computation was not intended to show costs or profit for the entire service, but merely to show that the proposed allowance "equalized" the drayage charges, east-side lines versus west-side lines, on an hourly basis. The inference is, of course, that the profits are to come from the shippers' portion of the haul. Under this theory the shipper would be taking care of such items as insurance and bond expense, collection of freight charges, and wear and tear on equipment while in use in carrier service. On a 5,000-lb. load handled by a truck on an hourly basis, the result would be:

From east-side on-track stations:	
Loading, 30 minutes	\$1.25
Unloading, 30 minutes	1.25
Road haul, 30 minutes	1.25
Bridge toll (round trip)	1.30
Total	\$5.05
5,000 lb. at 8 cents per 100—	
2 cents from railroad and 6 cents from consignee	\$4.00
From west-side off-track or on-track stations:	
Loading, 30 minutes	\$1.25
Unloading, 30 minutes	1.25
Road haul, 20 minutes	.84
Total	\$3.34
5,000 lb. at 6 cents per 100	\$3.00

It will thus be seen that on smaller loads the situation is not equalized. This witness used an hourly rate of \$1.68, figured on an average daily rate of \$16.50, in making his calculations on the 5,000-lb. load. Under that method the cost of handling business from the east side is \$3.82, and from the west side, \$2.24. No reason appears why a different hourly basis should be used in respect of a 5,000-lb. load. As a matter of fact the receiver of the small quantity would be more likely to use the trucks on a straight hourly basis than the receiver of the larger loads.

This witness concedes that if it were not for the minimum package charges imposed for the consignee's portion of the haul, no transfer company could "live" on the direct-delivery allowance. He stated, however, that his company could profitably haul tonnage from east-side stations to off-track stations in St. Louis at an allowance of \$2.60. Thus we have a situation where the railroad allowance for the haul to the constructive station must be bolstered up by the consignee's payment to become profitable, whereas the allowance paid for the haul to the off-track stations is profitable in and of itself. There is clearly a lack of balance.

Lax Methods

The methods followed at present in respect of according the direct-delivery service are very lax. As stated, no outbound and only three per cent of the inbound business, is moving in direct-delivery service. A consignee has the right to file standing orders with the east-side roads calling for the service, but no system is in vogue whereby the freight of that consignee is segregated for loading on separate trucks. The practice at East St. Louis stations is to move freight direct from the car to the waiting trailers of the transfer companies without regard to whether it is to move in direct-delivery service or to off-track stations. The result is that the freight is mixed in the trailer and the small amount of direct-delivery freight is lost sight of. Unless it so happens that it is loaded near the rear of the trailer and dropped off enroute, it goes along to the off-track station and is delivered from there. In the latter event the transfer company bills the railroads for the station allowance.

Improvements Needed in Direct Delivery

Clearly there will have to be much improvement in this respect if the direct-delivery business is to increase. Arrangements should be made whereby a shipper's order for direct delivery will mean just that. It is small wonder that the service has fallen into virtual decay. If it has one predominant thing in its favor, it is the simplification of the handling of freight from car door to store door. Carriers should do all in their power to educate shippers to its advantages. It is largely a matter of solicitation, but the solicitation should not and in fairness cannot be expected to come from a transfer company operating off-track stations and which must, in the nature of things, sacrifice its own financial interests if it encourages the business. The carriers should also take immediate steps to segregate direct-delivery tonnage from off-track station tonnage at East St. Louis freight stations. If they continue to stow it in a trailer with off-track station freight, the transfer company will continue to give it depot service and collect the depot allowance. It is not practical to do otherwise. It is no excuse to point out that the meager volume of tonnage does not justify such segregation. The tonnage will always be meager if it does not receive the direct service it is designed to receive.

* * *

Conclusions

We have seen that there is nothing violative of the laws which the commission administers in the proposals of the carriers to restrict the hauling on their behalf to a single transfer agency or in the establishment and maintenance of a constructive station at the west end of Eads bridge, as proposed. Likewise, this record is not convincing that the proposed limitation in the number of off-track stations to be operated will result in service which is inadequate for the public need, if the suggestions herein made in respect of direct-delivery service are carried out. But there are several features of the carriers proposals which at this time cannot be found justified.

There is no gainsaying the fact that the failure of the carriers, in the 21 years they have been compelled to pay these off-track station allowances, to enter into an exhaustive cost study to determine the proper amount of the allowances, merits severe criticism. No difficult accounting obstacles have presented themselves. The service performed is plain. The amount of tonnage handled has been at all times a matter of record. No difficulty is inherent in determining the amount invested by the transfer companies in equipment and station facilities. There is no necessity for allocation as between freight and passenger service. In spite of all these conditions, the allowances paid today are not based upon cost of service, but on the contrary represent a vague sort of compromise.

It is also true that there is complete lack of balance as between the allowances proposed for direct delivery and those for station service, and that the former service will not be availed of to any appreciable extent under the allowances proposed.

For these reasons it is recommended that the proposed schedules be found not justified and that an order be entered requiring their cancellation, discontinuing the proceeding in I. & S. 2934. The investigation on the commission's own motion should be held open in order to permit the carriers to enter into an exhaustive cost study with the view of determining the cost of the various services to be performed in connection with off-track station receipt and delivery, interchange between railroads and in direct deliveries. When they shall have been completed, the proceeding should be set down for further hearing for the purpose of introducing them in evidence along with supporting data and testimony, subject to cross-examination by interested parties. At that time the carriers should be prepared to advance the figures deduced from such studies as their proposed allowances for commission approval or amendment. In the meantime, the status quo of off-track stations in St. Louis should be preserved, and no new stations should be added to the tariffs.

The contract between respondents, on the one hand, and the Columbia, on the other hand, should be revised in the light of the criticisms herein contained.



A Stores Department Truck Used by the Santa Fe at Kansas City

Economical and Effective Equipment Maintenance*

*Correct lubrication a factor of greatest importance—
Maintenance plan described*

By A. E. Hutt

Vacuum Oil Company, New York

MOTOR coaches are vehicles designed and used for transporting passengers in a dependable, safe and comfortable manner. To meet these requirements they must operate without any mechanical failures, and all maintenance systems aim to keep them in this ideal condition, or as near to it as possible. It is necessary, however, that this result be accomplished at a minimum of expense, if the operation of the coaches is to be successful to the greatest extent. It is with this object in view that the system herein described has been developed.

Correct lubrication is the factor of greatest importance in efficient and economical maintenance. Most manufacturers of automotive equipment are agreed on this point, and stress the value of lubrication in their service bulletins. The highest grade lubricants constantly applied or renewed represent the cheapest single item of maintenance expense and actually do more real maintenance work than all the other items put together. Lubrication is anticipated or preventive maintenance; it prevents friction, the only real enemy that high grade machinery has.

Do not buy cheap and inferior products. It is the most expensive thing you can do. Buy the best lubricants the market affords. Use more oilers and greasers in your garages and you will need less higher priced mechanics in your shops. Just how long and how satisfactorily a vehicle will operate depends more upon proper lubrication than upon any other feature of its care. Bearing surfaces or assemblies which, when properly lubricated, will give years of perfect service, may be completely ruined by a few hours of neglect.

To insure getting an oil of the correct body and character for the unit to be lubricated requires an intimate knowledge of the unit itself and an equally intimate knowledge of the performance of that unit under all working conditions. This knowledge is acquired only by years of experience gained through contact with the company making the unit and by field and laboratory tests under extremes of operating conditions. With this knowledge as a background and after ascertaining the actual conditions governing the service of the unit under consideration, a competent board of lubrication engineers can recommend the oil best suited for a given make and type of engine.

The proper use of an oil demands:

1. Proper filling daily. Overfilling means overoiling. Underfilling means starvation of bearing surfaces, higher oil temperatures and increased percentages of contamination.
2. The use of clean measures or whatever is used to dispense the oil.
3. Keeping the oil screens clean of accumulated sediment. Do not ask too much of an oil screen. Its capacity is limited.
4. Keep crankcase clean by removing bottom pan periodically and cleaning.
5. Drain your crankcase periodically. If you are in doubt as

to whether you are doing this too often or not often enough, send samples of the drainage to your supplier who will be glad to advise you after he has analyzed them.

Remember that a properly refined oil does not wear out. Its lubricating value can be impaired by contamination with fuel, water, road dust, metallic particles, etc., and it is for this reason that periodic crankcase draining is necessary. These drainings however, should not be thrown away as there are several good oil reclaimers on the market that will separate the serviceable lubricant from the contaminants so that it can be used again. The reclaimed oil runs as high as 80 per cent of the total drainings and the cost of reclaiming it as low as 8 cents per gallon.

To be economical a system of maintenance should, therefore, do sufficient preventive maintenance to enable the various moving parts in the different units to operate satisfactorily and without undue wear for the greatest periods of time, and to apply corrective maintenance to these parts before the wear, which is bound to occur in them, has reached a stage where serious damage or even the total failure of the units may result. The work necessary to accomplish the above is divided into two departments: The general inspection department, and the unit overhaul department.

The General Inspection

The general inspection consists of an inspection of the whole vehicle at fixed intervals when necessary adjustments of bearing parts are made; bolts, nuts, screws, etc., tightened; valves ground, if need be and carbon removed; engine oil changed; the whole chassis thoroughly lubricated and whole units replaced by others, if necessary. Some companies adopt a calendar schedule for their inspection periods; others a mileage basis. As miles operated bear a more correct relation to wear and tear and to lubricants used than does elapsed time, the mileage basis is advocated and recommended.

The first requirement is the necessary means of keeping accurate records of the mileage performed by each vehicle. This can be obtained in two ways, either by daily odometer readings, where odometers are used, or by multiplying the number of trips performed in a day's work by the mileage for each trip. (If the latter method is employed, care must be taken that the various trip lengths be ascertained accurately, as for instance by running over each route with a car having an odometer in good condition and with tires inflated to the proper pressure.) The lengths of these trips should then be recorded in suitable form for the convenient use of the employee whose duty it is to compute the daily mileages of each vehicle. This form, for the sake of reference, we call the mileage chart.

Having decided to do our general inspection on a mileage basis and having provided means to figure the

* From an address before the Bus Division of the American Automobile Association at Cincinnati, Ohio, on June 27.

daily mileage of each motor coach, we now need to determine on what mileage basis we will do this work. Most companies using this basis set the mileage figure at the maximum at which they feel they can safely set it and let it go at that, feeling that if they religiously follow the schedule they have an economical system of general inspection. But have they? Are all routes in a system the same? That is to say, will the wear and tear on a coach be necessarily the same for a certain distance travelled on one route as for the same distance travelled on another? Do all drivers cause the need for the same amount of maintenance in the same number of miles of operation? I think you will readily answer "No" to these two questions. The use of what I term corrective factors to be applied to the actual miles travelled will take care of these variables.

Corrective Factors

In certain operations, conditions on different routes of the system may be such that different mileage allowances may be necessary for the general inspections in order that the maintenance will be proportional to the actual work performed by the coaches. In such operations certain routes can be selected as representing standard or normal conditions. For routes embracing travel or operation which may be considered either more or less severe than those which have been classed as standard, the wear of parts and consequent maintenance will naturally differ for a given mileage from what may be expected under the operation classed as "standard." It is, therefore, logical that provisions be made for different general inspection mileage allowances according to the routes on which the vehicles will have to operate.

To have the general inspection department do its work on different mileage bases for the different routes, with the possibility that the same vehicle may operate over several routes between general inspection periods, or to have the unit overhaul department rebuild the various units on different mileage bases according to the routes they might be operated on, with the possibility of the units changing from one vehicle to another between rebuilding periods, would entail nothing but confusion and an alarming amount of work.

In order to avoid this, the following method is advocated. Determine the general inspection mileage allowance for what is considered "standard" conditions, and allot to the routes meeting these conditions the "Factor 1." For routes other than "standard," certain "factors" should be determined and assigned, which factors, when multiplied by the mileage traveled on such routes, will translate the wear of motor coaches occurring on them to terms equal to the wear of coaches on "standard" routes.

For example, consider that the route selected as a representative "standard" consists of "city service," with a certain number of moderate grades and fair paving throughout. Another route, "X," may be over excellent paving, level throughout with a much smaller number of stops, and route "Y" may be a combination city service and suburban high-speed route with a considerable number of steep grades. The work performed by the coaches on route "X" would undoubtedly be less severe than that encountered over the "standard" route. Wear and consequent maintenance should also be less. This lessened wear and maintenance may be estimated (subject to later correction and revision) at say 80 per cent of the "standard" wear and maintenance. To such routes there would be assigned the factor "0.8." Similarly, operation on route "Y" might be classed as 20

per cent more severe than that set as "standard" and a factor "1.2" assigned to such route. Other factors may be determined and assigned to routes considered either more or less severe in operation than the conditions set as "standard."

The actual miles traveled, multiplied by these factors, will give the miles to be credited to the coaches on the general inspection sheet. For routes having a factor "1" the actual miles traveled will, therefore, be the miles to be credited on the general inspection sheet. For routes other than "standard" it will be seen, when a coach operates on a route having a factor of "0.8", that for each 2,500 miles that it operates, only 2,000 miles will be credited to it on the general inspection sheet. In this way the general inspection department can do its work on a standard mileage basis, regardless of the routes the coaches have worked on, although actually the travelled mileages will vary according to conditions encountered.

It should be noted, however, that only the daily travelled mileage is to be multiplied by the factor and the result added to the previous mileage recorded, as all daily mileages are not necessarily done over the same routes and, therefore, may be subject to different factors, according to the routes operated on: This is pointed out to prevent the record clerk from making the mistake (particularly where odometers are used to record miles travelled) of multiplying the accumulated mileage by the factor for the route instead of multiplying the actual daily travelled miles for any particular route, and adding the product to the previous mileage, which is the correct procedure.

To simplify the multiplying of actual miles by the different factors that might be needed, a table can be prepared showing all the possible daily miles to be travelled by one coach, multiplied by these different factors. This table would constitute a ready reckoner and obviate the necessity of all these multiplications having to be made each day by the record clerk.

Drivers are Variable Factors

The driver is another variable factor in the maintenance of a motor coach. One driver will cause the need of as much maintenance in 2,000 miles as another will in 3,000 miles because of the way he drives his coach, so that if this fact be taken into account in determining the mileage basis on which the maintenance work is to be done, advantage can be taken of the superiority of one driver over another which will result in still more accurate maintenance methods than if this factor is disregarded. With prevailing practices for determining the inspection mileages which are set to assure reasonably failure-proof service between inspection periods, the least efficient drivers must necessarily be the controlling factor, and, therefore, the coaches driven by the better drivers are actually given more inspections than they really require, which is a loss to the operating company as the coaches are removed from service for these periodical inspections more often than they need to be, and a coach out of service does not earn any money.

Maintenance Factors for Drivers

We have just shown how variable factors for the different routes are to be used. A similar procedure can be used for the drivers' factors. All drivers would be assigned a maintenance factor determined from the observations of the instructors or of other officials in a position to judge a man's ability. When a new man is put to work he would be given the lowest efficiency factor which would be the highest factor numerically,

and this would be changed as and when he showed, by his handling of the equipment and from reports of the condition of his coach from the mechanical department, that he was entitled to a better rating. The highest rating would give him the factor "1", and the lowest "1.5". Any man not able to qualify for the "1.5" rating should not be approved for work by the instructors. Incidentally, the efficiency factors could very well be used as the basis for remuneration of the drivers for their services to the company, which seems to be a far more sane and reasonable one than that of seniority.

When using driver factors as well as route factors for the general inspection mileages, the clerk in charge of figuring the mileages would multiply the route and driver factors together and use the resultant factor to obtain the mileage to be posted on the general inspection sheet from the ready reckoner just referred to. For example, if the driver's factor is "1.2" and the route factor "0.8", the resultant factor would be "0.9", which would be considered as "1", so that in this case the actual miles travelled would be the miles to be posted on the general inspection sheet.

By the use of these corrective factors the general inspection department does its work on a standard mileage basis, according to the miles posted on the general inspection sheet, but actually does this work, because of the use of these factors, on a basis that takes into account the variable before mentioned, routes and drivers.

Unit Overhauls

The unit overhaul system is offered in preference to the annual overhaul system which, as you all know, is used by some of the largest operating companies in the country and which consists of overhauling the entire vehicle thoroughly at the end of each year of its operation. There are three reasons why this system is unsound and uneconomical.

1. Not all coaches make the same mileage in the same space of time, owing to different schedule requirements, and wear and tear are directly proportional to miles traveled.

2. It is not unusual that, between periods of annual overhaul, repairs necessary on some particular units in various coaches may be such that at the time of general inspection, complete replacement of these units will be made because the repairs are beyond the scope of the general inspection department. In such cases, these units would probably not require attention at the annual overhaul period, although under the established annual overhaul practice, all units would be scheduled for overhaul regardless of the fact that they might have been in service for only a very short time.

3. Owing to the particular character of services performed, or due to their design, not all units that go to compose a complete coach are able to render the same satisfactory, failure-proof service for the same number of miles.

The unit overhaul system contemplates the overhauling or rebuilding of the various units that compose a coach on a mileage basis. The mileage basis for each unit is determined by its particular ability, due to its construction and the strains and stresses to which it is subjected, to give satisfactory failure-proof service for a certain number of miles of operation. It is, therefore, necessary to determine how the coach shall be divided into units, to number such units so that they can readily be identified and to determine what mileage allowance is to be allotted to them between overhauls. Determining how the coach shall be divided into units will depend to a large extent on the personal views of the official responsible for the maintenance of the fleet. Some will want to divide more finely than others. A word of caution is here offered that too fine a division, that is to say, a division that would create too great a number of separate units, would probably prove burdensome in detail and therefore uneconomical.

The following suggestion is offered as a reasonable division for a mechanical drive coach with magnetic ignition:

Engine	Body
Clutch	Magneto
Transmission	Lighting Generator
Differential Assembly	Starting motor
Chassis Assembly	Battery

In this division it will be noticed that the power plant and the cardinal units that transmit the power to the rear wheels are classed as units; also that such vitally important adjuncts as the magneto, lighting generator, etc., are so classed. Everything attached to the frame that has not been individually classed as a unit is grouped under a single unit called the chassis assembly.

Having determined what the units are to be and having numbered them in a permanent manner, such as by brass labels screwed on or with a steel stencil, it is next necessary to make out unit mileage record cards for each unit in the fleet, including spares. These cards are for the purpose of keeping records of the miles performed by each unit. The mileage for all the units that are assembled together as one coach must necessarily be the same as for the coach itself. The coach mileages are already available, so that if all the unit record cards for the units that are assembled together as one coach are put into one folder and the folder marked with the coach number, all that is necessary is to post the coach mileage on all the unit mileage record cards that are in the folder marked with that coach number.

Determination of Mileage Allowances

Having divided the coach into units and provided means for recording the mileage performed by each unit, it is next necessary to determine on what mileage basis each unit is to be rebuilt. For economical operation these mileages should be the greatest possible consistent with satisfactory operation, failure-proof service and long useful life of the unit. Several factors need to be taken into account in determining these mileage allowances.

1. The type or make of unit: Due to design or construction not all engines are capable of giving failure-proof or satisfactory service for the same number of miles of operation without an overhaul. The same thing is true of other units such as clutches, transmissions, etc.

2. The type of service the coach has to perform: A certain type of clutch might give satisfactory service for 50,000 miles in intercity work and give out in 20,000 or even 10,000 miles of operation in dense city service. Similarly, certain engines give remarkable service for long periods without overhauling in operations where they are not called upon to give more than a small percentage of their possible power output, but develop trouble very readily when used in operations requiring a maximum power output for long periods of time.

3. The type of routes over which the coaches have to operate: Smooth asphalt or concrete highways, rough unimproved roads, fairly flat operation and severe grades all have a decided influence on the shocks, stresses and strains that the various units have to withstand.

4. The climatic conditions experienced in the territory served and the housing facilities for the coaches: Long hard winters with much snow and ice on the highways introduce severe factors to be reckoned with, and the absence of heated garages or the necessity of keeping coaches standing out in very cold weather, as at railroad terminals, increases lubricating problems, since this necessitates the use of oils to cope with the low temperatures that are not the most efficient in protecting from wear due to friction between moving parts.

5. The varying efficiencies of the drivers operating the coaches.

All these factors have to be taken into account when determining the mileage allowances for the various units and the corrective factors to be applied to these mileages in order to vary them in accordance with the actual deterioration they will experience. Actual ex-

perience with the equipment will determine the mileage allowances, but where no actual experience is available, a conservative mileage should be allotted and adjusted later as the condition of the various units after use indicates. In fleets where only one type or make of vehicle is used it is a much simpler problem to arrive at the correct mileage allowances than it is in fleets where many different types and makes are used. On the other hand, where the latter condition prevails, the system of unit overhauls furnishes to the operator a very convincing picture of the comparative merits, for his service, of the various units that go to compose his fleet.

Having allotted certain mileage allowances to the various units and provided means to indicate when such mileages have been performed, it is then only necessary to notify the general inspection department when any units are due to be replaced by spare ones so that these units may be removed and sent to the unit overhaul department for overhauling and be ready later on to replace other units that will also have performed their allotted mileages.

When a unit change slip is turned in to the clerk in charge of keeping the unit records, he performs virtually the same operation as the mechanic who changed the units; that is to say, he removes the unit mileage record card for the removed unit from the coach folder and substitutes therefor the unit mileage record card for the unit with which it is replaced. In this way the replacement unit will be credited with the future mileage performed by the coach and the removed unit will not be credited with any more mileage until another unit change slip notifies the record clerk that this unit has again been put into service. In the meantime, the unit mileage record card for this removed unit is kept in an "out-of-service" folder.

It may be said that the use of this system entails too much red tape or too much clerical help. To this I would reply that the real work is done when the different mileage allowances and corrective factors have been determined. The correct use of these mileage allowances and corrective factors can be made by girls or boys with a high school education at a comparatively small expense. The economies to be effected, however, in mechanics' time and parts, will be many times what is paid out in additional clerical help.

More Passenger Traffic Going to the Highways*

By Ralph Budd
President, Great Northern

The trend of local passenger travel from the railways to the highways of the country, due to the increasing number of automobiles and highway motor coaches and the improvement of roads, has continued uninterruptedly through 1926 and 1927. The decrease in railway passenger revenue in 1927 compared with 1925 was \$78,800,000, and the decrease in the number of passengers handled was 51,000,000 or 5.8 per cent.

The astonishing thing is that many railway men thought and said in 1925 that the bottom had been reached in the decline of railway passenger travel. The conclusion seems inescapable that the railways have lost irretrievably the short-haul passenger business. The common-sense course open to them is to substitute

smaller, lower cost, gas or oil-electric units for steam-operated passenger trains; where trains are essential, and to eliminate unprofitable trains wherever they are not necessary. The latter process may be advanced by the operation of high-class, convenient motor coach service on highways adjacent to and often parallel with the railways.

Loss of Passenger Revenues

Probably the most striking statistics concerning the operation of the railways of the United States for recent years are those which show a decline in passenger revenues from \$1,290,000,000 in 1920 to \$980,000,000 in 1927, with practically no reduction in passenger train-miles during that period. The effect of this loss in passenger revenue is, therefore, a loss in net railway operating income of approximately \$310,000,000 in 1927 compared with 1920, or the equivalent of 1 per cent on \$31,000,000,000. This is more than the total investment in the railways of the United States.

It is the 20,600,000 private automobiles, and not the 90,000 motor coaches, that are responsible for this continuing decline in railway passenger revenue, although the total travel by motor coach is increasing, as is also the average length of ride per passenger. No one can say how much more railway travel will decline, but it is evident that the long-haul passenger business is going to remain with the railways just as the long-haul bulk freight will. To keep as much travel on railway trains as possible the railways are justified in providing extra fine through trains and small economical units for short runs and branch-line operations. In many places highway motor coaches can be substituted for unprofitable trains by co-operating with coach operators, or by the railways controlling the motor coach companies themselves.

Improvement in Coach Transportation

In Past Two Years

During the last two years there has been substantial improvement in motor coach transportation. The capacity of the coaches has been enlarged, until the newest types carry thirty-eight passengers. Luxuries have been added in the way of air-cushioned seats, interior baggage racks, hot-water heaters, storm windows, and ventilators. Chassis also have been improved in riding qualities, and motors of greater reliability and economy have been produced. The interiors of the latest motor coaches are painted in pleasing colors, giving a decorative effect comparable with the treatment of the fine transcontinental trains. Now, the use of aluminum alloy is proposed to lessen their weight by 3,000 lb., or more.

There is in active progress a series of consolidations of small motor coach companies into a lesser number of stronger and more efficient systems. In this respect, the motor coach situation, today, resembles the railway situation in the fifties, when amalgamation of many short lines into systems like the New York Central; the New York New Haven & Hartford; the Pennsylvania; the Baltimore & Ohio, and others was beginning. There is no doubt that larger and stronger motor coach companies will be able to improve upon the service of the small weak companies and to operate much more economically, just as the larger railway systems were able to improve upon the service of the many small railway lines operating independently. How far consolidation of motor coach lines will enable highway coaches to compete more effectively with the railways for long-haul travel, is one of the most important transportation problems of the day.

* From a letter published in the proceedings of the American Society of Civil Engineers in connection with a paper by Mr. Budd on the relation of highway transportation to the railway.

Commission Decisions Analyzed

Committee of Motor Coach Section, Motor Transport Division, reports on regulatory actions of states

ONE of the reports presented at the Atlantic City meeting of the Motor Transport Division, which aroused great interest, was that of a sub-committee of the Motor Coach section on the subject, "Action of the state railroad commissions in allowing railroads to co-ordinate rail and highway service; also, public opinion and reaction on co-ordinated service with railroads versus independent motor coach service." More than 100 commission and court decisions were analyzed in the preparation of the report and reproduced in it, these covering the period from January 1, 1922, to date. The report was prepared and presented by M. F. Steinberger, special engineer on the staff of the operating vice-president of the Baltimore & Ohio. The part of the report which presented excerpts from various decisions to indicate the viewpoint of the regulatory bodies is abstracted below:

In general, most of these states have held that the operation of motor vehicles parallel to a railroad line will not be authorized where the railroad is giving adequate service or where the railroad evidences a willingness to provide additional service. While not directly stated in most of the opinions, the inference is that this additional service may be given by railroads through the medium of motor coaches, though it is generally stated in these opinions that the right to operate motor coaches is not one of the charter rights of the railroad company. For instance, the following sample decisions may be quoted as generally indicative of the viewpoint of these bodies.

In Arizona, ruling was made that:

"Operation of motor vehicles parallel to a railroad line will not be authorized where the railroad is giving adequate service and reduction in revenue from competition may cause discontinuance of train service."

California's ruling is that:

"An auto truck service should not be authorized as a link in a steamship and motor truck line when existing railroad and express service is adequate and the new carrier cannot offer any superior service, either as to time or at a materially lower cost."

Attitude of Commissions

It may be of interest to note that the disposition of most of these railroad commissions, as laid down by their decisions, is not to grant certificates to independent companies where the railroad companies show a willingness to provide additional service in one way or another which the commissions may feel is of public convenience and necessity. This has been exemplified generally in the experience of the New Haven, the Boston & Maine and the Maine Central in the territory they serve and with respect to their applications for motor coach permits.

It is felt that difficulties will continue to be encountered in cases where the railroad companies are applying for certificates to operate over routes over which independent operators have already secured permits. This situation has arisen largely from the fact that most of the railroad companies delayed too long in their efforts to inaugurate motor coach service and thereby enabled the independent operators to secure a foot-hold.

In Colorado, it was ruled that:

"A certificate for the operation of an automobile passenger and freight line should be refused when it appears that exist-

ing railroad service adequately meets public need, and motor coach operation will not be authorized over a road which is being satisfactorily served by a carrier."

As to Illinois, the following is a quotation from the opinion of the Illinois Supreme Court in the Egyptian Transportation Company case:

"A railroad company is entitled to an opportunity to supply all necessary service before a certificate of convenience and necessity is granted to a competing motor coach line, and it is immaterial that the railroad has no charter power to operate motor coaches."

Later, a decision of the public service commission makes this statement:

"The priority of the right of a railroad company to serve in territory in which a motor coach line proposes to operate should be construed as a priority to give such service as the railroad is designed to give and which under its charter power it is authorized to give."

This would indicate an endeavor on the part of the Illinois commission to neutralize the effect of the Supreme Court order. Another decision along the same line by the Illinois commission is:

"The operation of motor coaches for the transportation of passengers over and along the highways cannot be considered a transportation service incident to the operation of a railroad company in the maintenance and operation of a railroad under its charter powers."

In Iowa a decision in one case indicates the feeling that it is desirable for the railroad companies to operate motor coaches, in view of their facilities and experience as compared with carriers.

Responsibility of Railways

In Maine, a decision in one case was that:

"No permit will be granted where the existing service by the steam or electric railways is reasonably safe and adequate."

In another case they stated:

"A certificate of convenience and necessity should be denied for the operation of a motor carrier service by a new company over a route where a similar service is proposed by a subsidiary to a railroad company, whose experience in operating responsibility, financial resources and permanency are established."

In Maryland, the commission rendered a decision that:

"The mere fact that a railroad company does not protest against the operation of a parallel motor coach line does not relieve the commission of the obligation of preventing such duplication of service if it is not necessary to the public."

In Massachusetts, in one of the New Haven cases, it was ruled that:

Public convenience and necessity was held to require that a railroad should operate motor vehicles for the transportation of passengers upon particular routes, in view of the fact that the railroad was a substantial taxpayer, that its passenger service was being injured by operating deficits, and that the savings of the people were invested to a large extent in the securities of the railroad."

In Minnesota, it was ruled that:

"A State need not deny itself the economic possibilities of auto transportation merely because of competition with railroads whose concern is chiefly with interstate commerce, and which are subject to a paramount control which, by subordinating the interest of the intrastate shipper to the interstate shipper, has violated and forced a change in the State policy regarding the movement of freight in intrastate commerce."

In Montana, the commission ruled that:

"Motor vehicle operation should not be authorized in competition with railroad service unless the service rendered by the auto carrier is far superior to the service furnished in the territory, and so essential to the public convenience that such operation is justified." . . . "Motor vehicle operation will not be authorized in territory that is adequately served by railroads."

In New Hampshire, the following ruling has been made:

"A certificate should be granted authorizing the operation of motor coaches by a transportation subsidiary to a railroad company, when the desirability of the service is to be demonstrated before requesting permission to abandon street railway service."

In New Jersey and New York

In New Jersey, the commission says:

"The operation of passenger motor coaches in competition with a railroad will not be allowed when a considerable amount of traffic is taken from the railroad which renders safe and adequate service."

The New York commission ruled as follows:

"a certificate will be given a motor coach company although the operation will be in competition with a traction company, where the traction company has not availed itself of an opportunity given it to improve service." . . . "Motor coach operation may be authorized notwithstanding there are adequate railroad facilities between the same points, where there is a demand for coach service in preference to railroad transportation; and where the coach fare is much higher and the running time longer, no substantial competition can be felt."

North Dakota says:

"It is no ground for granting a certificate for motor freight operation, which will compete with a railroad, that such operation offers certain conveniences to shippers, when the shippers are satisfied with the present facilities."

The Ohio Supreme Court says:

"Where a motor transportation company applies for a certificate of public convenience and necessity to transport freight in a territory where the record shows necessity for such service and shows that the protesting common carrier is not adequately rendering such freight service, and where, so far as the record shows, the route in question can be granted without in any way deranging the freight business of the common carriers operating within such territory, it is the duty of the Public Utilities Commission to grant such application for the territory in question." In another case it is stated, "The order of the commission is unreasonable and unlawful as it does not properly protect the rights, if any of other haulers of freight."

In Oklahoma, the Supreme Court affirmed the granting of a certificate by the state commission upon the ground that the word "necessity" means a public need, without which the public is inconvenienced to the extent of being handicapped in the pursuit of business or wholesome pleasure, or both, without which its people generally of the community are denied, to their detriment, that which is enjoyed by other people generally similarly situated.

Pennsylvania Rulings

In Pennsylvania, the following rulings have been made:

"The encouragement of motor vehicle operation in new fields opened by state highways and as auxiliary to existing steam and electric railways carriers should be limited to places where public interest will benefit without impairing or destroying the steam and electric railways serving the public within their established fields."

"A certificate of convenience and necessity for the operation of autos as common carriers between points served by a railroad company should be denied when the volume of business between the proposed termini is not such as to require or support both railroad and motor coach service."

The Rhode Island commission says:

"There is no public convenience and necessity for the operation of motor coaches between cities when the adequate service of steam and electric railroads cannot be maintained if the coach competition is permitted."

South Dakota

In South Dakota, one ruling was made that:

"Public convenience and necessity does not require granting a certificate to a motor carrier to operate between points adequately served by a railroad although the motor service may be a material convenience and although the railroad service may be susceptible of improvement."

Another ruling was that:

"The operation of a motor freight line parallel to a railroad as authorized where the earnings of the motor carrier indicated a public demand for more expeditious service than that furnished by the railroads, and where the motor carrier

furnished a class of service that was exceptionally convenient to the patrons."

Utah Decisions

In Utah, the following ruling was made:

"The operation of a competitive automobile service should not be permitted between points adequately served by a railroad when the railroad has recently been constructed and for a series of years will require all revenues that it can accrue to meet necessary expenses."

Another ruling was that:

"The best interests of the general public are served by the stabilization of public service agencies operating in a given field, rather than permitting them to be subjected to the ruinous hazard of competition."

In another decision it was ruled that:

"A railroad company with a large investment and operating at a loss will be granted a certificate for an auto passenger and express stage line, which will be supplementary to and co-ordinated with the rail service, and which will be supplanted by the rail service in the winter when the coach service is the least desired and is hazardous, in preference to granting a certificate to an individual for passenger service over a similar route, although both applicants give good service; particularly where the individual, after expressing an intent to comply with the law, continues to operate without making a report as to the basis for taxation and has not attempted to comply with the statute in other respects."

In another instance it was stated that:

"The operation of an automobile stage line will not be authorization over a route adequately served by a railroad and other motor coach lines, although the proposed service would be an added convenience to the territory."

In Vermont, the ruling was made that:

"A railroad company, by acquiescing in the grant of a certificate to operate a competitive motor coach line because a curtailed train service is inadequate for the public needs, is not prevented from obtaining a revocation of the certificate that will enable the railroad to restore adequate service, where the certificate was granted under a statute to promote the general good."

In Virginia, the following ruling was made:

"Public convenience and necessity was held to require the granting of a certificate authorizing motor coach service which could be substituted for an unprofitable railroad service without increasing the expense of travel but greatly increasing the comfort and convenience of the traveling public."

Decision in Washington

In the State of Washington, the now famous Buck case is the outstanding decision, which resulted in the decision of the United States Supreme Court that neither it nor any other state commission had power over any interstate line. In another decision, the Washington Department of Public Works ruled that:

"Unimpaired railroad service is more essential than truck service, although in some cases where the haul is short and the character of the chief commodity transported is particularly adapted to truck transportation, auto competition with rail lines may be permitted."

This same state ruled that:

"Authority to operate an intrastate motor coach service should be denied when the train service along the proposed route is sufficient."

The West Virginia Ruling

In West Virginia, the local courts as well as the West Virginia Supreme Court of Appeals ruled that:

"No permit to operate motor vehicles for hire should be issued by the State Road Commission until it is established upon a proper investigation that the privilege so sought by the applicant is necessary or convenient for the public, and that the proposed service is not then being adequately performed by any other persons, partnership or corporation."

"The public policy of the State, as expressed in legislative enactments, requires that public utilities be given reasonable protection from detrimental competition. Wherefore, when an existing carrier is one of several applicants for the initial permit to operate motor coaches over a highway between points served by the railroad of the carrier, and is fully qualified to render the additional service proposed, the State Road Commission should ordinarily give the preference to the carrier."

It may be stated in this connection that the situation in West Virginia is still not settled. The independents

who were affected by this decision have succeeded in having the matter placed in the hands of the United States Supreme Court, and no decision is expected until the fall term of 1928.

In Wyoming, the ruling was made that:

"A certificate should be granted authorizing motor carrier service, notwithstanding competition with a railroad, if railroad service is inadequate and additional railroad service would not be feasible."

In another case ruling was made that:

"Authority should not be granted to operate a motor carrier line in competition with railroads whose revenues might be seriously impaired, when the public convenience, as distinguished from the convenience of a class, would not be served."

Railroad Operation Favored

A member of the committee whose experience is in New England reports that the states of Maine, New Hampshire, Vermont, Massachusetts and New York have co-operated with the railroads in establishing motor coach service by the railroads and have in some cases heartily encouraged the plan of co-ordinating highway and rail service. He further states that, wherever there is need of motor coach service along the lines of the railroad, either supplementing the rail service or acting as a feeder line to the rail line, the state commissions in almost every case will favor the railroad motor coach operation in preference to independent operators. He also says that he has found the public very much interested, and has received many favorable comments on the service given by the railroad subsidiaries.

The foregoing excerpts from the various decisions, together with about 100 detailed decisions which accompany this report, seem to indicate a desire on the part of the public service commissions to give reasonable protection to the railroads against independent operators, but in many cases predicated upon the willingness of the railroads to furnish a service which would be as adequate as that which will be a fact if the motor coach competition is permitted. It would appear, therefore, that if the railroads would co-operate to the extent of establishing motor coach service, it is probable that they would receive the preference in the granting of permits over routes not already served by independents who have been granted permits because of the unwillingness of railroads to give a service which the public utilities commission have felt is desired over these routes.

A Communication

Liability Insurance Carried By Union Pacific Stages

PORTLAND, ORE.

TO THE EDITOR:

With reference to the question as to whether motor coach companies should carry liability insurance or should take care of claim and liability payments through the building up of a reserve fund. This company carries liability insurance as follows: Fifteen thousand dollars for death of or injury to one person; \$60,000 for death of or injury to more than one person; \$2,000 for loss of or damage to property of any person or persons other than the assured. The state commissions in this territory require motor carriers to file with the commissions a liability and property damage insurance policy or substitute security in lieu of insurance policies. As our operation is new and limited, we feel it is preferable to carry liability insurance.

J. P. O'BRIEN,
President, Union Pacific Stages, Inc.

Motor Transport News

THE BLACK HILLS TRANSPORTATION COMPANY, operating motor coach tours in the Black Hills of South Dakota under contract with the Chicago, Burlington & Quincy, has recently added two more motor coaches to its fleet. The company now operates nine motor coaches.

THE AMERICAN ELECTRIC RAILWAY ASSOCIATION will hold its annual convention at Cleveland, Ohio, from September 22 to 28 inclusive. Among the exhibits will be more than 25 displays of automotive manufacturing and equipment concerns.

DAILY MOTOR COACH SERVICE around Lake Tahoe, Cal., has been established by the Tahoe Transportation Company. This service connects with the Southern Pacific train and motor coach service at Tahoe station.

ACCORDING TO PRESS REPORTS, the Los Angeles & Salt Lake contemplates the withdrawal of local passenger train service between Los Angeles, Cal., Pasadena, Long Beach and Anaheim, and the substitution of motor coach service in its place. The company is reported to have applied to the California Railroad Commission for permission to carry out these proposed changes.

THE SOUTHERN PACIFIC MOTOR TRANSPORT COMPANY has leased the Stage Terminal building at Sixth and Salmon streets, Portland, Ore., the terminal having formerly been operated by the Strong & McNaughton Trust Company. Thirteen motor coach lines now use this terminal, including the Union Pacific Stages and the Spokane, Portland & Seattle Transportation Company, as well as the Southern Pacific. J. W. James, who was formerly connected with the Southern Pacific Motor Transport Company at Corvallis, Ore., has been appointed manager of the Portland terminal.

Jersey Commission Serves Order on Interstate Operator

The Arrow Bus Line, an independent, unregulated company operating interstate between New York City and the New Jersey municipalities of Caldwell, Montclair, Passaic and Paterson in competition with several railroad lines serving those points, has been ordered by the New Jersey Board of Public Utility Commissioners to cease operating motor coaches in the state of New Jersey equipped with seats which block the aisles. The practice is characterized as unsafe and is in violation of regulations laid down by the board.

Southern Pacific Increases Western Oregon Coach Service

The Southern Pacific Motor Transport Company has established new schedules and increased service in western Oregon as follows:

Three additional round trips in each direction between Portland, Ore., and Corvallis, via Newberg.

Complete local service between Salem, Ore., Dallas and Falls City, making highway and electric train connections.

Complete service between Salem and Silverton and also between Silverton and Woodburn, connecting at Salem and Woodburn with main line trains and motor coaches.

New service at Roseburg and Marshfield, connecting at Roseburg with main line trains, and also between Marshfield, Coquille and Powers, connecting with trains at Marshfield.

Complete local motor coach service between Medford, Ashland and Klamath Falls.

Optional Train or Coach Service Offered by Union Pacific

For the journey between Portland, Ore., and Pendleton, through the Columbia river gorge, passengers on the Union Pacific, holding any kind of railroad ticket, may ride either on the trains or on the motor coaches operated by the Union Pacific Stages. Passengers routed via the Union Pacific to or from Portland, Tacoma or Seattle, now have the option to use the Portland Limited or the Continental Limited on the

railway, or they may transfer to the motor coaches operating on regular schedules over the Columbia river highway between Pendleton and Portland. Optional passage either by rail or motor coach now applies also between Pendleton, Ore., and Walla Walla, Wash.

Northland Proposes Motor Truck Operation

The Northland Transportation Company, subsidiary of the Great Northern and one of the largest railway motor coach operating companies in the United States, is now proposing to engage in freight service through the operation of motor trucks. It has filed an application with the Minnesota Railroad & Warehouse Commission for permission to operate motor trucks between Kelly Lake, Minn., and Grand Rapids, where such service is necessary to provide freight facilities in place of a local freight train which has been discontinued. The proposed truck route lies in the Mesabi iron range in northern Minnesota. The commission held a hearing on the application on August 8, but has not yet granted the necessary authority.

The Northland recently established its first motor coach route in the far west, all of its operations in the past having been centered around the Twin Cities and Duluth, Minn. The new western route lies between Bend, Ore., and Klamath Falls, a distance of approximately 150 miles.

Alton Transportation Company to Operate Chicago-St. Louis Line

The Alton Transportation Company, jointly with the Chicago & Joliet Transportation Company and the Illinois Traction System, will soon begin the operation of a motor coach line between Chicago and St. Louis, Mo. Each of these companies was granted a certificate covering a portion of the route by the Illinois Commerce Commission with the understanding that they would operate the line jointly. The service will be provided directly by the Alton Transportation Company and the equipment owned by it. On account of its being in receivership, however, the Chicago & Alton has disposed of its stock in the Alton Transportation Company to the other two companies participating in the operation of the Chicago-St. Louis line. The sale of stock was made with the provision that the Chicago & Alton retains the right to buy back the stock at any time within two years.

Truck Lines for Long Distance Moving of Household Goods

Officers of 153 moving and storage companies in 43 cities of the East and Middle West met at French Lick, Ind., recently

according to the Journal of Commerce (New York) and perfected the organization of a co-operative association, equipped to launch a long distance moving service by truck under the title of the Allied Van Lines, Inc.

Stock of the company, it is said, will be owned by the National Furniture Warehousemen's Association, representing many millions of dollars invested in storage and transportation facilities, and operations will begin on August 1.

Isolated enterprises of similar character have finally been drawn into one big organization in which the member firms will act merely as agents under the control of dispatchers for the van lines.

New truck bodies have been designed for the organization which provide sleeping quarters for the relief driver on long trips, in a bunk over the chauffeur's seat, so that day and night driving will be feasible.

Besides its speed in delivery the new service is designed to eliminate crating and packing expense for household goods and door-to-door service between any two cities.

So far the van lines have issued permits only as far West as Kansas City, but it is planned to extend it very soon to the Pacific Coast, so that moving will have facilities equal to the express business.

Seventeen states are included in the present organization, from Nebraska to the Eastern seaboard, and Virginia, West Virginia and Kentucky on the South.

Orders for Equipment

THE BOSTON & MAINE TRANSPORTATION COMPANY has taken delivery of two parlor type Studebaker motor coaches.

THE WADLEY SOUTHERN which operates the Short Lines Motor Transport has taken delivery on a 4-cylinder Mack motor coach with seats for 15 passengers and with a large baggage compartment in the rear.

Motor Transport Officers

Howard P. Savage, assistant general manager of the Chicago, North Shore & Milwaukee, has been appointed general manager of the Marigold Motor Coach Lines, comprising the Metropolitan System operated by the North Shore Line. He succeeds Fred A. Klock, who has resigned from the service.



Central Garage for South African Railway Motor Vehicles, Cape Town